DIGENETIC AND ASPIDOGASTRID TREMATODES FROM MARINE FISHES OF CURAÇAO AND JAMAICA†

F. M. NAHHAS
and
R. M. CABLE,

Department of Biological Sciences,
Purdue University, Lafayette, Indiana

I. ACKNOWLEDGMENTS

This study was supported by National Science Foundation Grant G-14691, and was facilitated by the cooperative assistance of personnel of the Caraibisch Marien-Biologisch Instituut, Curaçao, and the Marine Biological Laboratory, Jamaica, W. I. Thanks are due especially to Dr. Ingvar Kristensen, Director of the laboratory in Curaçao, and to Dr. Ivan Goodbody, Department of Zoology, University College of the West Indies. We wish to express our appreciation also to Dr. J. E. Randall, University of Puerto Rico, for the identification of certain fishes and to Mrs. Mary Hanson Pritchard and Professor H. W. Manter of the University of Nebraska, Dr. Franklin Sogandares of Tulane University, and Dr. Allen McIntosh of the Beltsville Parasitology Laboratory for the loan of specimens and many helpful suggestions.

II. INTRODUCTION AND HISTORICAL REVIEW

This paper concerns adult digenetic trematodes parasitizing marine fishes of Curaçao and Jamaica and is a continuation of a study begun by one of us (R. M. C.) in Puerto Rico in 1951 and reported in a series of publications (Cable, 1954a, 1954b, 1956a, 1956b; LeZotte Jr., 1954; Siddiqi and Cable, 1960). Results of that investigation indicated need for further study of larval and adult trematodes of shallow waters adjacent to Carribbean islands separated by deep water which could serve to isolate certain populations of intermediate and definitive host species.

During 1961 the authors spent 7 months in the Caribbean region, 3 in Curaçao and 4 in Jamaica. The purpose of the trip was twofold: (1) the examination of as many shallow-water fishes as possible with emphasis on duplicate or congeneric species from the two localities, and (2) the study of cercariae and as many of their life histories as time and facilities permitted. Four papers reporting life cycles and larval trematodes have appeared (Cable, 1962; Cable and Nahhas, 1962, 1963; Cable, 1963).

The work on digenetic trematodes in the Western Atlantic-Gulf-Caribbean region was pioneered by Linton who reported about 75 species from Woods Hole, Mass. (1898, 1900, 1901, 1940) and several additional ones from Beaufort, North Carolina (1905), Bermuda (1907) and Tortugas, Florida (1910). Those areas were restudied by a number of investigators and especially by Manter, whose papers appearing from 1925 to 1949 have made the region one of the better known so far as its trematode fauna is concerned. Other contributions have been made by Hanson (1950) who studied Barkker's collection from Bermuda, and by Sparks (1957, 1958, 1960) who investigated the trematode fauna of the Bahama Islands and Grand Isle, Louisiana. Sogandares-Bernal (1959) compared the faunas of Bimini and the Panama Pacific and, in a series of papers in collaboration with others (Sogandares-Bernal and Hutton, 1959a, 1959b, 1959c; and Sogandares-Bernal and Sogandares, 1961), studied the helminth parasites from Tampa and Boca Ciega Bays, Florida, and the Atlantic Coast of Panama. In Cuba, Pérez Vigueras (1940a, 1940b, 1955a, 1955b, 1955c, 1956, 1958) reported a number of trematodes from several vertebrates including marine fishes. Major studies on larval forms have been made by Cable (1956b) who reported 51 marine cercariae from Puerto Rico, and by Holliman (1961) who described 28 species from the Apalachee Bay area of Florida. Less comprehensive studies will be cited in the discussion of species.

During this study, we examined 1527

---

† Based on a thesis of the first author, submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, Purdue University, August, 1963.

fishes representing 185 species. Of these, 698 individuals belonging to 124 species were collected in Curaçao, and 829 representing 127 species in Jamaica. Common to both localities were 68 species, of which 5 harbored no endoparasitic trematodes. The same was true of 34 species in Curaçao and 21 in Jamaica. Usually, but not always, species negative for parasites were represented by individuals that were immature or few in number.

Fishes from both localities yielded a total of 178 species of mature aspidogastrid and digenetic trematodes. Of these, 100 were found in Curaçao and 140 in Jamaica, with 62 common to both localities. Included were 40 new species, of which 20 occurred in Curaçao and 25 in Jamaica, with 5 common to both. One of the 5 was reported in connection with its life history (Cable and Nahhas, 1962); this paper includes descriptions of the remaining 39 new species in presenting and discussing data concerning the trematode fauna of Caribbean fishes. The system of La Rue (1957) is used for higher taxa, with a major revision concerning the position of the acanthocolpids in his system.

III. Methods

Fishes were obtained from several sources including traps, nets, spear-fishing, use of rotenone, and commercial fishermen. Whenever possible, fish were kept alive in tanks and killed shortly before examination; others were examined as soon as possible, usually within two hours of death. When time permitted, the trematodes were studied alive, particularly to determine the extent of the bladder and other aspects of the excretory system. After removal from the host, they were washed in 0.7% saline and fixed with corrosive sublimate-acetic acid solution under light coverglass pressure. The worms were transferred to a dish, left in fixative for up to several hours, depending on the size of the worms, washed in several changes of water, dehydrated to 70%, left in 70% iodine-alcohol overnight to remove excess mercury, and stored in small vials of 80% alcohol. Most of the specimens were stained with Semichon's carmine, cleared in methyl salicylate and mounted in damar.

Most of the figures and their scales were drawn by microprojection but a few were free-hand. Differences in depth of focus may result in some dimensions not corresponding with text figures: the measurements given in text are exact. Measurements are in millimeters except where indicated as being in microns. Sucker ratios were calculated from the average of the length plus the width, and are expressed with the oral sucker taken as 1.

Type specimens of all new species and representatives of a few previously described ones are deposited in the Helminthological Collection of the United States National Museum. One asterisk indicates a new host record; two a new synonymy. The letters C and J indicate localities, Curaçao and Jamaica, respectively.

IV. Description and Discussion of Species

FAMILY ASPIDOGASTRIDAE Poche, 1925

Cotylogaster basiri Siddiqi & Cable, 1960
Host: *Calamus bajanado (J).
Site: intestine.

Lobatostoma ringens (Linton, 1905) Eckmann, 1932

Synonyms: Aspidogaster ringens Linton, 1905; *Cotylogaster chaetodipteri* MacCallum, 1921.

Host: **Micropogon furnieri* (J).

Site: intestine.

The above species, like the freshwater aspidogastrids, probably are primarily parasites of mollusks but are able to survive and even flourish in the intestine of vertebrates that feed on those hosts. Quantities of mollusk shells were found in the digestive tract of all of the fishes that harbored aspidogastrids.

Superorder *Anepitheliocystidia* La Rue, 1957
Order *Strigeatoidea* La Rue, 1926
Suborder *Brachylaimata* La Rue, 1957
Superfamily *Bucephaloidea* La Rue, 1926

FAMILY BUCEPHALIDAE Poche, 1907

Bucephalus varicus Manter, 1940

Hosts: Caranx bartholomaei (J); *C. crysos* (C); *C. hippos* (C, J); *C. latus* (C, J); *C. ruber* (C, J); **Chloroscombrus chrysurus* (J); **Seriola dumerili* (J).

Site: ceca and intestine.

A great deal of variation was observed in the specimens from the several hosts and from individuals of the same host species. These variations may be explained by the condition of the worms at the time of fixation, their age, and possibly development in different host species.

Bucephalus scorpaenae Manter, 1940
Host: Scorpaena plumieri (C, J).
Site: ceca and intestine.

The Curaçao material is in almost complete agreement with Manter's description. The specimens from Jamaica have a somewhat longer cirrus sac which sometimes extends to the anterior margin of the anterior testis.

The next species is figured and described but not named because only a single specimen was found and it does not show such diagnostic features as the shape of the tentacles and extent of the excretory vesicle.

Bucephalus sp.
Figure 1
Host: Centropomus undecimalis (J).
Site: ceca.
Deposited specimen: U.S.N.M. 60248.

Description: Body elongate, tapering posteriorly, truncate anteriorly, 1.03 long, 0.20 wide at level of ovary. Entrie cuticle spinose. Rhynchus sucker-like, 0.173 long, 0.20 wide, its tentacles retracted, probably 7 in number. Pharynx about equatorial in position, 0.053 long, 0.060 wide; esophagus not evident; cecum subtriangular. Gonads in posterior half of body. Testes tandem, contiguous, to right of mid-line, 0.090-0.117 long, 0.083 wide; cirrus sac 0.347 long, 0.058 wide, containing ovoid seminal vesicle and long pars prostatica surrounded by prostate cells. Genital atrium wide, spherical. Vitellaria 12-14 follicles on each side, anterior to pharynx. Ovary 0.060 long, 0.100 wide, anterior to testes, at about level of seminal vesicle; uterine seminal receptacle present; uterus extending anterior to vitellaria, containing few normal eggs, 15-17 by 10-12 μ. Excretory vesicle tubular, anterior extent not determined.

The next species, although previously reported, is redescribed for reasons given below.

Alcicornis carangis MacCallum, 1917
Figure 2
Host: Caranx ruber (C).
Site: intestine.
Deposited specimen: U.S.N.M. 60249.

Description based on 3 specimens. Body elongate, 1.58-2.1 long, 0.30-0.40 wide. Entire cuticle spinose. Rhynchus wedge-shaped, 0.566-0.633 long, 0.167-0.200 in greatest width; tentacles 7, varying in shape and length with degree of extension, 0.180-0.267 long exclusive of filament, 0.030-0.045 wide at base; each with 2 lateral prongs and terminal filament, proximal prong more than twice as long as distal one; filament may be lost. Pharynx, seen in only one specimen, at level of anterior testis, 0.060 in diameter; esophagus not evident; cecum mostly anterior to anterior testis. Testes tandem, contiguous, to right of midline, level variable, 0.120-0.186 in diameter; cirrus sac 0.567-0.580 long, 0.100-0.133 wide, on left side of body, containing ovoid seminal vesicle, long pars prostatica and prostate cells. Ovary entire, anterior to testes, 0.133-0.146 long, 0.080-0.100 wide; uterus voluminous, extending from rhynchus to posterior end of body, sometimes overlapping posterior end of rhynchus. Genital atrium wide; genital pore at a distance from posterior end of body. Vitellaria in 2 lateral groups of 12-17 follicles each, mostly in anterior half of body. Eggs 18-22 by 13-15 μ. Excretory vesicle not seen; excretory pore terminal.

This species was known only from its incorrect description by MacCallum (1917) until it was found again by Pérez Vigueras (1955a). Our specimens agree with his redescription and show tentacles which have 2 lateral prongs. MacCallum described the tentacles as being "branched like the antlers of a deer" and his figure shows a single prong on each tentacle. In our specimens, the number of prongs visible depends on the degree to which the tentacle is extended. Thus in the same individual, one tentacle may show both prongs and another only the distal one.

Siddiqi and Cable (1960) reported *A. carangis* from *Caranx ruber* in Puerto Rico. Comparing their specimens with ours indicates that their material represents a new species of *Alcicornis,* for which the name *A. siddiqii* is proposed. The following description was included by Siddiqi and Cable in their original manuscript from which redescriptions of known species were deleted before publication.

Alcicornis **siddiqii** n.sp.
Figure 3

Synonym: ***Alcicornis carangis* of Siddiqi & Cable, 1960, nec MacCallum, 1917.
Host: *Caranx ruber* (Puerto Rico).
Site: stomach.
Holotype: U.S.N.M. 39302 (deposited by Siddiqi & Cable).

"Description based on 10 specimens: Body 0.884-1.293 long, 0.165-0.198 wide; cylindrical posteriorly, tapering anteriorly. Cuticle spinose. Rhynchus wedge-shaped, 0.118-0.147 by 0.067-0.099 exclusive of tentacles of which there are 7, each with 2 processes; cilium absent. Pharynx spherical. 0.039-0.045 in diameter, somewhat posterior to midlevel and submedian; intestinal sac median, small, equatorial. Testes 2, entire, 0.082-0.097 by 0.075-0.090, tandem, contiguous, submedian to right, overlapped by pharynx and cirrus sac. Cirrus sac within posterior half of body, contaning sac-like seminal vesicle, long pars prostatica and prostate cells; genital pore ventral, a short distance from posterior end of body. Ovary entire, 0.070-0.096 by 0.066-0.075, submedian, anterior to testes and intestine; seminal receptacle absent. Vitellaria scanty, in 2 short lateral bands of small follicles immediately anterior to ovarian level. Uterus voluminous, confined to posterior 2/3 of body, extending slightly anterior to vitellaria. Eggs numerous, 0.024-0.026 by 0.012-0.014. Excretory vesicle tubular, extending to level of vitellaria; excretory pore terminal, without evident sphincter."

Of the 4 species of *Alcicornis* that have been previously recognized, *A. siddiqii* differs from *A. carangis* in size of rhynchus, in the anterior extent of the uterus and evidently by lacking tentacular filaments; from *A. baylisi* Nagaty, 1937, in having a smaller *rhyncus,* shorter excretory vesicle and more anterior vitellaria; from *A. longicornutus* Manter, 1954, in having relatively much shorter tentacles with 2 prongs each; and from *A. cirrudiscoides* Velasquez, 1959, in having much smaller eggs.

Dollfustrema macracanthum Hanson, 1950
Hosts: *Gymnothorax moringa* (C); **G. vicinus* (C).
Site: intestine.

Deposited specimen: U.S.N.M. 60250.

This species was described by Hanson as having one testis. Her material included 80 specimens but her description is based on "eleven larger specimens, and particularly the holotype." A reexamination of the type specimen reveals to us what looks like the faint outline of an anterior testis located at about the same level as the one seen distinctly in our material.

Dollfustrema muraenae Sogandares-Bernal, 1959

Hosts: **Gymnothorax funebris* (J); **G. moringa* (C, J).
Site: intestine.
Deposited specimen: U.S.N.M. 60251.

The most distinctive features of this species are the position of the vitellaria and the 3 rows of slender spines on the rhynchus. In our 37 specimens, topography of the gonads varies. The testes are usually symmetrical but may be diagonal, often with the right testis anteriormost. The ovary is usually nearer the left testis and either anterior to it or between the testes. The uterus occupies all available space between the rhynchus and the posterior end of the body. In contracted specimens, the rhynchus is drawn into the expanded anterior end of the body so that the vitellaria form a semicircle just posterior to the rhynchus and the cecum is drawn closer to that organ. Eggs in the Curaçao specimens measure 24-26 by 15-18 μ, and in the Jamaican material 24-28 by 16-21; Sogandares-Bernal (1959) gave a range of 24-33 by 19-27.

Dollfustrema **gymnothoracis** n.sp.
Figure 4

Host: *Gymnothorax vicinus* (C).
Site: upper intestine.
Holotype: U.S.N.M. 60252.

Description based on 18 specimens. Body elongated oval, more pointed posteriorly, 1.03-1.66 long, 0.400-0.714 wide. Entire cuticle spinose. Rhynchus 0.098-0.120 long, 0.120-0.165 wide, sucker-like when inverted; with 5 or 6 rows of spines, 5 μ long, which, except for being closer together than those on adjacent cuticle, are not noticeably different from spines elsewhere. Pharynx at level of gonads, 0.060-0.075 in diameter; esophagus about same length as pharynx, cecum directed anteriorly. Testes symmetrical in younger specimens, diagonal in larger ones, 0.135-0.200 long, 0.075-0.113 wide; cirrus sac 0.293-0.333 long, 0.093-0.146 wide, containing elongated seminal vesicle, long pars prostatica and prostate cells. Ovary intertesticular, close to right testis, 0.100-0.113 long, 0.068-0.105 wide; uterus extending anteriorly in front of vitellaria, but never reaching rhynchus, and posteriorly almost to end of cirrus sac. Genital atrium spacious; genital pore ventral, well removed from posterior end of body. Vitelline follicles form an inverted U extending anteriorly from midlevel of testes in immature specimens, distinctly anterior to testes in older ones, but never intruding into anterior fifth of body length. Eggs thick-shelled, 33-42 by 22-27 μ. Excretory vesicle tubular extending to about anterior end of cirrus sac.

The arcuate arrangement of the vitelline follicles and the more posterior testes distinguish this species from all others in the genus except *D. echinatum* (Komiya and Tajimi, 1941). That species, known only from the metacercaria, differs from *D. gymnothoracis* in having a conical rather than cup-shaped rhynchus. In other respects, *D. gymnothoracis* is similar to *D. muranae* and *D. bipapillosum* Manter and Pritchard, 1961. In those species, however, the vitellaria and uterus extend to the rhynchus which is larger than in *D. gymnothoracis*, and has rows of long spines well differentiated from the adjacent body spines.

Nearly all of our specimens of *D. gymnothoracis* were massively infected with coccus-like granules.

Rhipidocotyle baculum (Linton, 1905) Eckmann, 1932

Synonyms: Gasterostomum baculum Linton, 1905; *Gasterostomum* sp. Linton, 1901; *Nannoenterum baculum* (Linton, 1905).

Host: **Scomberomorus cavalla* (C).

Site: intestine and ceca.

Our material is referred to *Rhipidocotyle baculum* as described by Linton (1901, 1905); his later paper (1940) evidently includes more than one species as *Nannoenterum baculum. Rhipidocotyle baculum* is very similar to *R. adbaculum* Manter, 1940, which Manter (1940c) distinguished on the basis of "size and shape of the cephalic disc which in *R. adbaculum* is larger and has a dorsal point. The body is larger and more elongate." In body shape, our material is more like *R. baculum.* The shape of the cephalic disc is variable but in no case was a dorsal point evident nor did the cephalic disc extend laterally beyond the edges of the body. In some specimens, the uterus extends to the anterior level of the vitellaria.

Siddiqi and Cable (1960) reported *Prosorhynchus stunkardi* from *Scomberomorus* sp. A reexamination of paratypes indicates that *P. stunkardi* is a synonym of either *R. baculum* or *R. adbaculum.* Because the specimens were dead when removed from the host, the body and cephalic disc are not normal in shape.

Bucephaloides longoviferus (Manter, 1940) Hopkins, 1954

Synonyms: ***Bucephalopsis longoviferus* Manter, 1940; *Gasterostomum* sp. Linton, 1910 in part.

Host: Sphyraena barracuda (C, J).

Site: ceca and intestine.

Bucephaloides longicirrus (Nagaty, 1937) Hopkins, 1954

Synonyms: Bucephalopsis arcuatus of Manter, 1940, nec Linton, 1900; *B. arcuatus* of Siddiqi & Cable, 1960, nec Linton, 1900.

Host: Sphyraena barracuda (C, J).

Site: ceca and intestine.

Discussion: Manter 1963b draws attention to the fact that in the specimens from *Sphyraena barracuda* referred by him (1940c) and by Siddiqi and Cable (1960) to *Bucephaloides arcuatus,* the excretory vesicle does not extend beyond the pharynx whereas it terminates well anterior to that structure in the species as originally described by Linton (1900). We have confirmed that difference between *B. longicirrus* and *B. arcuatus* in both the Puerto Rican specimens and the present ones.

Bucephaloides arcuatus (Linton, 1900) Hopkins, 1954

Synonyms: Gasterostomum arcuatum Linton, 1900; *Gasterostomum* sp. Linton, 1900; *Bucephalopsis arcuatus* (Linton, 1900) Eckman, 1932.

Host: **Scomberomorus cavalla* (C, J).

Site: intestine and ceca.

Prosorhynchus atlanticum Manter, 1940

Synonyms: Gasterostomum sp. Linton, 1910 from *M. bonaci; Gasterostomum* sp. Linton, 1910 from *M. venonosa.*

Hosts: Mycteroperca bonaci (C, J); **M. falcata* (C); *M. venonosa* (C).

Site: ceca and intestine.

Manter (1940c) distinguished this species from *P. pacificum* by the larger eggs with thicker and darker shells. Hanson (1950) was of the opinion that the 2 overlapped in that respect and synonymized them. *P. pacificum* has eggs 24-27 by 12-17 whereas they measure 29-36 by 18-24 in our specimens and 31-36 by 21-24 in those of Siddiqi and Cable (unpublished data). We regard that difference as being of specific magnitude.

Prosorhynchus aguayoi Pérez Vigueras, 1955

Host: Rypticus saponaceus (C, J).

Site: intestine.

Deposited specimen: U.S.N.M. 60253.

Eggs from the Curaçao material tend to be shorter and wider (38-43 by 24-27 μ) than those from Jamaica (40-46 by 21-26) but their measurements overlap. Pérez Vigueras gave an average egg size of 40 by 26.

Prosorhynchus promicropsi Manter, 1940

Host: Promicrops itaiara (J).

Site: intestine.

Prosorhynchus ozakii Manter, 1934

Host: **Mycteroperca bonaci* (C).

Site: intestine.

Superfamily *Fellodistomatoidea* La Rue, 1957

FAMILY FELLODISTOMATIDAE Nicoll, 1913

Antorchis urna (Linton, 1910) Linton, 1911

Synonym: Mesorchis urna Linton, 1910.

Hosts: Pomacanthus arcuatus (C, J); *P. paru* (C, J).

Site: ceca and intestine.

Antorchis holacanthi Siddiqi & Cable, 1960

Host: Holacanthus tricolor (J).

Site: ceca.

Mesolecitha linearis Linton, 1910

Synonym: ***Proctoeces neomagnorus* Siddiqi & Cable, 1960.

Host: Acanthurus coeruleus (J).

Site: intestine.

Reexamination of the type of *Proctoeces neomagnorus* revealed the presence of cirrus spines which in combination with a spherical rather than tubular seminal vesicle distinguish the genus *Mesolecitha* from *Proctoeces. P. neomagnorus* thus agrees with *Mesolecitha linearis* as does our single specimen and is reduced to synonymy with that species.

Proctoeces maculatus (Looss, 1901) Odhner, 1911

Synonyms: Distomum subtenue Linton, 1907; *Proctoeces subtenuis* (Linton) Hanson, 1950; *Proctoeces erythraeus* Odhner, 1911.

Host: **Lactophrys tricornis* (J).

Site: intestine.

Heretofore, this trematode has been reported from species of *Calamus*. Our single specimen from a trunkfish may represent an accidental infection.

Proctoeces lintoni Siddiqi & Cable, 1960

Hosts: **Calamus arctifrons* (J); **C. bajanado* (J).

Site: intestine.

Tergestia acuta Manter, 1947

Hosts: Caranx bartholomaei (J); **C. crysos* (J).

Site: intestine.

Tergestia laticollis (Rud., 1819) Stossich, 1899

Synonyms: Distoma laticolle Rudolphi, 1819; *Pharyngora polonii* Molin of Olsson, 1869.

Host: **Clepticus parrae* (C, J).

Site: intestine.

Tergestia pectinata (Linton, 1905) Manter, 1940

Synonyms: Distomum pectinatum Linton, 1905; *Theledra pectinata* (Linton, 1905) Linton, 1910.

Hosts: **Caranx bartholomaei* (J); **C. hippos* (J); *C. latus* (C, J); **Oligoplitis saurus* (J); **Opisthonema oglinum* (J); *Selar crumenophthalmus* (J).

The next species closely resembles the genus *Tergestia* except that the oral sucker does not have lobes and the cervical region lacks the lateral folds characteristic of that

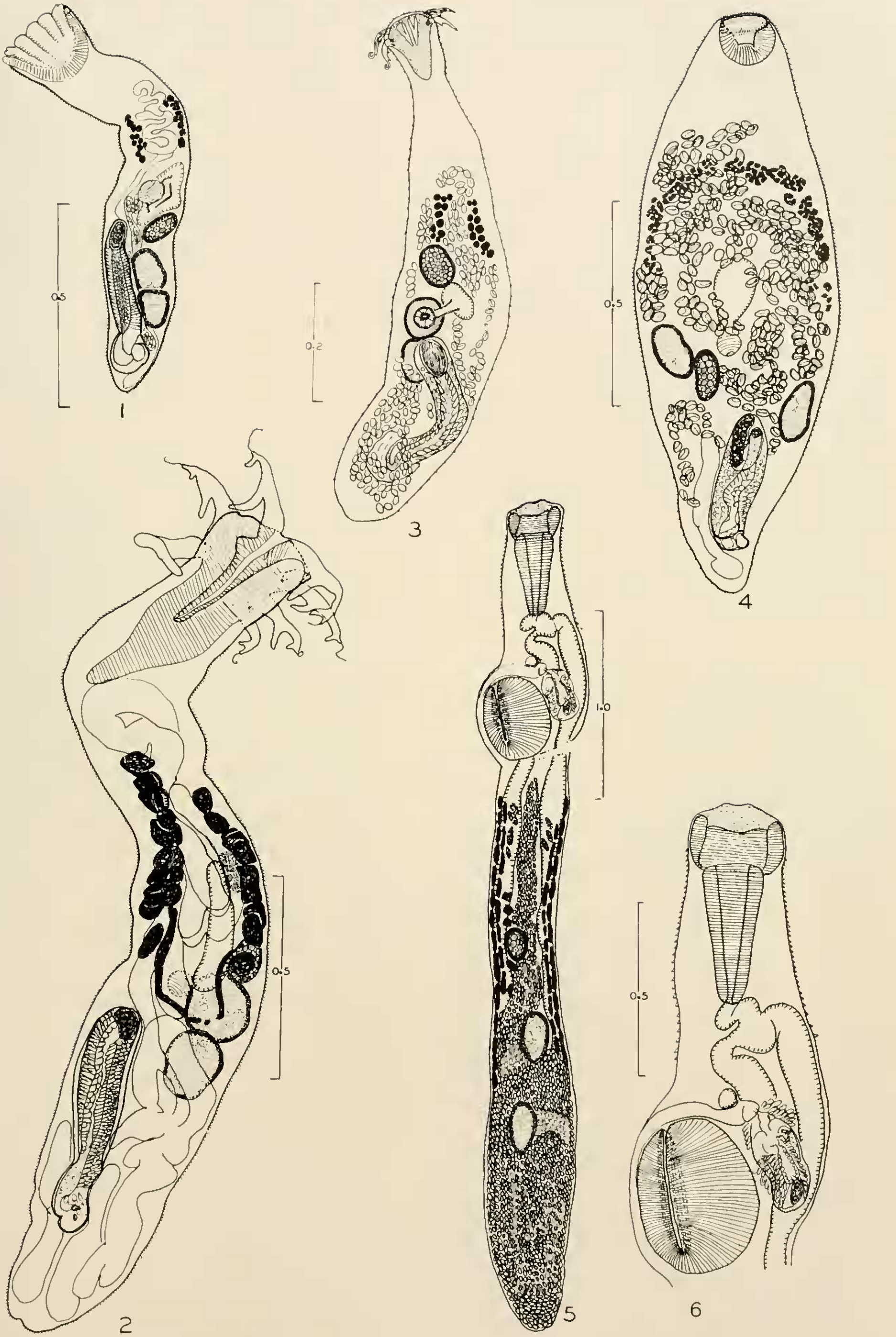


Figure 1. *Bucephalus* sp., dorsal view. **Figure 2.** *Alcicornis carangis,* dorsal view. **Figure 3.** *Alcicornis siddiqii,* holotype, ventral view (from Siddiqi and Cable, 1960). **Figure 4.** *Dollfustrema gymnothoracis,* holotype, ventral view. **Figure 5.** *Gymnotergestia chaetodipteri,* holotype, ventral view. **Figure 6.** Same, forebody enlarged.

genus. To receive the species, a new genus is proposed and characterized as follows; the generic name refers to the absence of ornamentation of the forebody:

Gymnotergestia n.g.

Diagnosis: Fellodistomatidae. Distomes with elongated body; cuticle unarmed, annulated, especially in forebody. Oral sucker cup-shaped, without lobes. Prepharynx absent; pharynx elongated, conical; ceca long. Testes 2, diagonal or tandem; cirrus sac well-developed, at level of acetabulum; external seminal vesicle absent. Ovary pretesticular; true seminal receptacle absent; uterus voluminous, extending posterior to gonads; metraterm muscular. Vitelline follicles numerous, in lateral fields posterior to acetabulum. Genital pore median, anterior to acetabulum. Excretory vesicle Y-shaped. Parasites in intestine of marine fishes.

Type and only species:

Gymnotergestia chaetodipteri
n.g., n.sp.

Figures 5 and 6

Host: Chaetodipterus faber (J).
Site: lower intestine.
Holotype: U.S.N.M. 60254.

Description based on 3 specimens. Body slender, 1.66-4.28 long, 0.380-0.567 wide at level of acetabulum. Cuticular rings of forebody giving lateral margins a serrated appearance. Oral sucker 0.140-0.187 long, 0.200-0.280 wide; ventral sucker 0.320-0.440 long, 0.247-0.340 wide, with longitudinal aperture; sucker ratio 1:1.67. Hindbody 2-3 times length of forebody. Pharynx 0.300-0.413 long, 0.123-0.173 in greatest width; esophagus short; ceca extending to posterior end of body. Testes 2, diagonal or tandem, 0.173-0.286 long, 0.140-0.173 wide, separated by uterine coils; posttesticular space one-half as long to equal length of forebody. Cirrus sac large, to left of ventral sucker, containing saccular seminal vesicle, large pars prostatica and long folded cirrus. Ovary entire, pretesticular, 0.126-0.186 long, 0.106-0.133 wide, separated from anterior testis by uterine coils. Uterine seminal receptacle present; uterus voluminous, occupying most of hindbody; metraterm half as long as cirrus sac, muscular. Genital atrium small; genital pore median, a short distance anterior to ventral sucker. Eggs thick-shelled, 30-36 by 20-25 μ. Vitelline follicles in lateral fields between acetabulum and posterior testis. Excretory vesicle bifurcating at ovarian level, its arms extending to sides of pharynx to receive main collecting tubules.

The larva of this species probably is similar to *Cercaria caribbea XL* which Cable (1956b) described from Puerto Rico. It has the elongated pharynx characteristic of *Gymnotergestia chaetodipteri* and lacks the oral lobes that are known to be developed in at least some cercariae of the genus *Tergestia.*

Infundibulostomum **anisotremi** n.sp.

Figure 7

Host: Anisotremus virginicus (J).
Site: intestine.
Holotype: U.S.N.M. 60255.

Description based on a single specimen. Body ovoid, more broadly rounded anteriorly than posteriorly, 0.767 long, 0.374 wide. Cuticle spinose, spines extending to posterior level of testis. Eye-spot pigment absent. Oral sucker 0.078 long, 0.083 wide; ventral sucker about equatorial, 0.063 long, 0.069 wide; sucker ratio 1:0.71. Prepharynx 0.013 long; pharynx 0.040 long, 0.033 wide; esophagus slightly shorter than pharynx; ceca short, extending to near posterior level of vitellaria. Testis somewhat irregular, submedian, 0.105 long, 0.159 wide; cirrus sac arcuate, to left of ventral sucker, containing large internal seminal vesicle and prostatic complex; external seminal vesicle immediately posterior to ventral sucker. Ovary entire, to left of midline, at level of testis, 0.111 by 0.075; seminal receptacle median to ovary; uterus filling posttesticular space, extending anteriorly to form convolutions on right side of body between testis and level of intestinal bifurcation, metraterm simple. Genital pore median, immediately anterior to acetabulum. Eggs numerous, 18-21 by 10-13 μ. Vitellaria in 2 lateral clusters of 6 or 7 follicles each, at level of acetabulum. Excretory vesicle not observed.

Infundibulostomum anisotremi, the second species in its genus, differs from *I. spinatum* Siddiqi & Cable, 1960, in the shape of the body, extent of spination, shape and size of the oral sucker, and the sucker ratio.

The systematic position of species assigned to the genus *Bacciger* is confused by the absence of a distinct cirrus in *B. harengulae* which led Yamaguti (1958) to assign that genus to the family Cryptogonimidae. He stated that a cirrus sac is absent because Stossich did not show that structure in *B. bacciger* even though both Nicoll (1914) and Palombi (1934) clearly described a cirrus sac in species in *Bacciger.* We have found a well-developed cirrus sac in a species from *Opisthonema oglinum* but it is absent in another from *Sardinella macrophthalmus.* Evidently the two cannot be assigned to the same genus and therefore we restrict to the genus *Bacciger* those species having a cirrus sac and erect a new genus as follows for those in which it is absent:

Pseudobacciger n.g.

Diagnosis: Fellodistomatidae. Body short; cuticle spinose; eye-spot pigment absent; distomate, ventral sucker in anterior half of body. Pharynx and esophagus present; ceca not extending to posterior end of body. Testes 2, symmetrical, postacetabular; cirrus sac absent. Ovary intertesticular; seminal receptacle present; uterus chiefly posttesticular. Vitellaria compact, lateral masses in acetabular region. Eggs small. Excretory vesicle V-shaped. Parasites in intestine and ceca of marine fishes. Type species: *Pseudobacciger harengulae* (Yamaguti, 1938) n.comb.; (Synonym: *Bacciger harengulae*). other species: *Pseudobacciger manteri* n.sp.

Pseudobacciger manteri n.g., n.sp.

Figure 8

Synonym: ***Bacciger harengulae* of Manter, 1947, nec Yamaguti, 1938.

Host: Sardinella macrophthalmus (J).

Site: ceca.

Holotype: U.S.N.M. 60256.

Description based on 20 specimens. Body oval to pyriform, 0.373-0.747 long, 0.266-0.420 wide. Entire cuticle spinose. Oral sucker terminal, 0.045-0.068 in diameter; ventral sucker preequatorial, 0.057-0.090 in diameter; sucker ratio 1:1-1.3. Prepharynx not evident; pharynx 0.033-0.045 in diameter; esophagus 1-2 times length of pharynx; ceca extending a short distance posterior to testes. Testes 2, equatorial to somewhat preequatorial, symmetrical, 0.060-0.090 long, 0.065-0.105 wide; cirrus sac absent; seminal vesicle indistinctly bipartite, extending slightly posterior to ventral sucker; pars prostatica indistinct. Ovary irregular to lobed, 0.060-0.090 in diameter, intertesticular, median, at about posterior level of testes; seminal receptacle small, overlapping ovary or not; uterus chiefly posttesticular; metraterm simple. Genital atrium small; genital pore median, near intestinal bifurcation. Vitelline follicles in 2 largely extracecal groups of 7-10 each at about level of ventral sucker. Eggs 21-24 by 15-20 μ. Excretory vesicle V-shaped, with arms passing ventral to ceca, to terminate at esophageal level; excretory pore terminal.

Manter (1947) reported this species as *Bacciger harengulae* Yamaguti, 1938, from 3 specimens of which one was partly crushed. He noted its resemblance to Yamaguti's material but indicated that it differed in having more rounded eggs and somewhat longer ceca; he was unable to see the excretory vesicle. Measurements given by Yamaguti overlap those of the present species which has consistently longer ceca and arms of the bladder extending farther anteriorly than in the Japanese species.

The next species is named with hesitation because it may be the one that Price (1934) described as *Steringotrema ovata* from a single specimen. Both occur in the same host species and agree in all respects except the topography of the gonads. Price's specimen was examined but it was faded and the gonads were so indistinct that their identity and arrangement could not be determined with certainty.

Bacciger **opisthonemae** n.sp.

Figure 9

Host: Opisthonema oglinum (J).

Site: ceca and intestine.

Holotype: U.S.N.M. 60257.

Description based on 6 specimens. Body oval to somewhat pyriform, 0.386-0.493 long, 0.240-0.300 wide. Entire cuticle with fine spines; eye-spot pigment absent. Suckers subequal, 0.042-0.067 in diameter, oral sucker slightly subterminal, ventral sucker about equatorial. Prepharynx not evident; pharynx 0.033-0.037 in diameter; esophagus very short; ceca extend to or slightly beyond midlevel of hindbody. Testes 0.040-0.060 in diameter, smooth or somewhat irregular, symmetrical to slightly diagonal, near posterior margin of ventral sucker; cirrus sac pyriform, 0.090-0.112 long by 0.051-0.060

wide, median, anterior to or slightly overlapping ventral sucker, containing saccate seminal vesicle, pars prostatica, conspicuous prostate cells and cirrus. Ovary 0.040-0.068 in diameter, median to submedian, intertesticular or slightly posterior to level of testes; uterus mostly postovarian; metraterm simple. Vitelline follicles in 2 groups of 5-8 each, mostly extra-cecal, near level of acetabulum. Genital pore median or slightly submedian, near posterior edge of pharynx. Excretory vesicle V- or Y-shaped with short stem, arms extending to pharyngeal level.

Removing from the genus *Bacciger* species lacking a cirrus sac leaves only *B. bacciger* (Rud., 1819) and *B. nicolli* Palombi, 1934. Both differ from the present species in having shorter ceca and more extensive vitellaria with follicles extending well into the forebody.

Suborder *Azygiata* La Rue, 1957
Superfamily *Azygioidea* Skrjabin & Guschanskaja, 1956
FAMILY BIVESICULIDAE Yamaguti, 1939

Bivesicula caribbensis Cable & Nahhas, 1962

Host: Myripristis jacobus (C, J).
Site: pyloric ceca.

Order *Echinostomida* La Rue, 1957
Suborder *Paramphistomata* Szidat, 1936
Superfamily *Paramphistomatoidea* Stiles & Goldberger, 1910
FAMILY PARAMPHISTOMATIDAE Fischoeder, 1901

The following species is identified as the one Pérez Vigueras (1940a) described as *Macrorchitrema havanensis.* In erecting the genus *Macrorchitrema,* he discussed various genera of amphistomes but did not mention *Cleptodiscus* with which *Macrorchitrema* is clearly synonymous. Our specimens and his were from the same host species and because his description is not complete or generally available, the species is redescribed as follows:

Cleptodiscus havanensis (Vigueras, 1940) n.comb.

Synonym: ***Macrorchitrema havanensis* Vigueras, 1940.
Host: Holacanthus tricolor (J).
Site: intestine.
Deposited specimen: U.S.N.M. 60258.

Description based on 3 specimens. Body broadly rounded posteriorly, tapering anteriorly, 4.57-5.79 long, 1.35-1.64 in maximum width. Cuticle thin, with a few minute spines near anterior end of body; eye-spot pigment present. Pharynx 0.233-0.266 long, 0.166-0.200 wide, with 2 retrodorsal diverticula. Ventral sucker at posterior end of body, 1.20-1.35 long, 0.965-1.06 wide, with longitudinal aperture. Esophagus 0.868-1.013 long, 0.040-0.060 in maximum width at muscular bulb near intestinal bifurcation, surrounded by gland cells along entire length; ceca not extending posterior to ovary. Testes 2, irregular to lobed, 0.466-0.714 long, 0.366-0.667 wide, diagonal, close together or separated by coils of uterus; anterior testis and cirrus sac near intestinal bifurcation; cirrus sac pyriform to spherical, 0.185-0.225 long, 0.135-0.180 wide, containing sinuous internal seminal vesicle, pars prostatica, prostate cells, and relatively short cirrus; sac followed by very long, convoluted seminal vesicle. Ovary smooth, 0.220-0.266 in diameter, near anterior edge of acetabulum, to right or left (in one specimen) of midline; seminal receptacle not evident; Mehlis' gland posterior to ovary; uterus mostly dorsal, between acetabulum and anterior testis. Genital pore midventral, at or slightly anterior to intestinal bifurcation. Eggs thick-shelled, more pointed at one end, 60-86 by 40-51 μ. Vitelline follicles in lateral fields, extending from anterior edge of acetabulum to about midlevel of anterior testis. Excretory system not observed. Lymphatic channels two, extracecal, extending from near posterior end of body to sides of oral sucker.

This species is distinguished from *C. reticulatus* Linton, 1910, by the much larger ventral sucker, its longitudinal aperture and the more anterior position of the testes and vitellaria. Hanson (1955) described a bipartite cirrus sac in *C. bulbosus,* a species which is more like *C. reticulatus* than the present one. In our specimens, the external seminal vesicle may be compactly coiled or not and, because of the adjacent membranes of the lymph channels and parenchymal vesicles, appears to be embedded in a relatively much denser tissue that could be mistaken for the posterior division of a bipartite cirrus sac.

Superfamily *Notocotyloidea* La Rue, 1957

FAMILY PRONOCEPHALIDAE Looss, 1902

Glyphicephalus candidulus (Linton, 1910) Siddiqi and Cable, 1960

Synonyms: Himasomum candidulum Linton, 1910; *Barisomum candidulum* (Linton) Price, 1931; *Pleurogonius candidulus* (Linton) Manter, 1947.

Hosts: Angelichthys ciliaris (J); *Pomacanthus arcuatus* (J).

Site: intestine.

Suborder *Echinostomata* Szidat, 1939

Superfamily *Haploporoidea* Mehra, 1961

Mehra (1961) proposed the superfamily Haploporoidea to include the Haploporidae, Waretrematidae, Haplosplanchnidae and Megaperidae. Although the first 2 families are questionably distinct, Cable (1962) gave evidence that they are closely related to the Haplosplanchnidae. As to the Megaperidae, its placement with those families in a common superfamily is less certain because the development of the excretory system was not observed when Cable (1954b) reported the only cercaria known to be a megaperid larva. Thus it is not certain that the primary excretory pores are in the tail and that the bladder lacks an epithelium as would be expected if the megaperids were closely related to the other families that Mehra has placed in the Haploporoidea. Although Manter erected the family Megaperidae, he later (1963a) reduced it to the rank of a subfamily in the Lepocreadiidae; Cable (1954b) had previously suggested a close affinity with that family. However, it seems likely that further studies may support Mehra and for that reason, his view is tentatively accepted here by including the Megaperidae in the Haploporoidea. At this point it may be noted that the genera *Enenterum, Cadenatella,* and *Jeancadenatia* which generally are placed in the Lepocreadiidae, have many features in common with those of families included in the Haploporoidea and ultimately may be transferred to that superfamily. In the absence of life history studies, however, those genera are tentatively retained in the Lepocreadiidae.

FAMILY HAPLOPORIDAE Nicoll, 1914

Hapladena varia Linton, 1910

Hosts: Acanthurus hepatus (C, J); *A. coeruleus* (J).

Site: intestine.

The specimens from Curaçao were mostly immature but a few were sufficiently developed to make identification possible. Cable (1962) described the first haploporid cercaria and suggested on morphological and ecological evidence that it may be the cercaria of *H. varia.*

Hapladena ovalis (Linton, 1910) Manter, 1947

Synonym: Deradena ovalis Linton, 1910.

Hosts: **Sparisoma brachiale* (J); *S. flavescens* (J); **Pseudoscarus guacamaia* (J).

Site: intestine.

Allomegasolena spinosa Siddiqi & Cable, 1960

Hosts: Chaetodipterus faber (J); **Lutianus apodus* (J).

Site: ceca.

Five specimens agree with the description given by Siddiqi and Cable except that sucker ratio may reach 1:1.68 and the eggs attain a length of 75 μ.

Megasolena archosargi Sogandares-Bernal & Hutton, 1959

Host: **Archosargus unimaculatus* (J).

Site: intestine.

Eight specimens from 5 fish are in agreement with the description given by Sogandares-Bernal and Hutton (1959a) except in the size of the eggs which in our material measure 60-75 by 39-47 μ as compared with 73.5-88.2 by 42-48.3.

FAMILY HAPLOSPLANCHNIDAE Roche, 1925

Haplosplanchnus **mugilis** n.sp.

Figure 10

Host: Mugil curema (C).

Site: intestine.

Holotype: U.S.N.M. 60259.

Description based on 13 specimens. Body elongated, tapering posteriorly, 0.780-1.15 long, 0.220-0.467 wide. Cuticle aspinose; eye-spot pigment present. Oral sucker 0.075-0.120 long, 0.083-0.135 wide; ventral sucker 0.138-0.180 long, 0.096-0.168 wide, on a short peduncle; sucker ratio 1:1.27-1.55. Prepharynx short; pharynx 0.037-0.063 in diameter; esophagus as long as pharynx; cecum extending to about anterior level of ovary. Testis entire, 0.150-0.165 long, 0.083-0.120 wide, about midway between acetabulum and posterior end of body; seminal vesicle tubular, sometimes reaching level of ovary; pars prostatica large, spherical to ovoid; prostate glands diffuse, inconspicuous; ejaculatory duct short. Ovary entire, anterior to testis, 0.090-0.120 long, 0.053-0.105 wide; seminal receptacle dorsal, near ovary; uterus extending posterior to testis. Genital pore midway between pharynx and acetabulum. Eggs 48-63 by 30-36 μ, containing oculate miracidia. Vitellaria of 10-12 inconspicuous follicles scattered between posterior edge of seminal vesicle and anterior third of testis. Excretory bladder not observed; its pore terminal.

This is the first species of *Haplosplanchnus* to be reported from the Gulf-Caribbean region. Of the 3 previously described species, *H. mugilis* is most like *H. pachysomus* (Eysenhardt, 1829), but differs in having a shorter seminal vesicle, shorter peduncle of the acetabulum, a spherical or ovoid pars prostatica and the uterus extending posterior to the testis. It differs from *H. caudatus* (Srivastava, 1939) in the same respects and also in body shape. In *H. purii* Srivastava, 1939, the testis is in the extreme posterior end of the body, the cecum and seminal vesicle are long, the vitellaria are compact, and the pars prostatica tubular.

Schikhobalotrema acutum (Linton, 1910) Skrjabin & Guschanskaja, 1955

Synonyms: Deradena acuta Linton, 1910; *Haplosplanchnus acutus* (Linton) Manter, 1937.
Hosts: **Strongylura ardeola* (C); *S. raphidoma* (J); *S. timucu* (C).
Site: intestine.

Schikhobalotrema adacutum (Manter, 1937) Skrjabin & Guschanskaja, 1955

Synonym: Haplosplanchnus adacutus Manter, 1937.
Hosts: Abudefduf saxatilis (J); **Halichoeres pictus* (J); **Hemiramphus brasiliensis* (C, J); **Hepsetia stipes* (J).
Site: intestine.

Schikhobalotrema obtusum (Linton, 1910) Skrjabin & Guschanskaja, 1955

Synonyms: Deradena obtusa Linton, 1910; *Haplosplanchnus obtusus* (Linton) Manter, 1937.
Host: Acanthurus hepatus (C).
Site: intestine.

Schikhobalotrema adbrachyurum Siddiqi & Cable, 1960

Hosts: **Sparisoma flavescens* (C); **S. viride* (C); **Pseudoscarus guacamaia* (C, J); **P. plumbaeus* (J).
Site: intestine.

Schikhobalotrema pomacentri (Manter, 1937) Skrajabin & Guschanskaja, 1955

Synonym: Haplosplanchnus pomacentri Manter, 1937.
Hosts: **Pomacentrus analis* (C); **P. fuscus* (C, J); **P. leucosticus* (C); **Microspathodon chrysurus* (C, J).
Site: intestine.

Schikhobalotrema sparisomae (Manter, 1937) Skrjabin & Guschanskaja, 1955

Synonym: Haplosplanchnus sparisomae Manter, 1937.
Hosts: **Pseudoscarus guacamaia* (C, J); **Scarus croicensis* (C); **Scarus* sp. (J); **Sparisoma abildgaardi* (C, J); **S. brachiale* (J); **S. flavescens* (J); **S. radians* (J).
Site: intestine.

Schikhobalotrema **bivesiculum** n.sp.

Figure 11

Host: Abudefduf saxatilis (J).
Site: intestine.
Holotype: U.S.N.M. 60260.

Description based on 6 specimens. Body elongated, more tapered posteriorly than anteriorly, 0.965-1.40 long, 0.347-0.467 wide. Cuticle aspinose; eye-spot pigment present. Oral sucker 0.098-0.180 long, 0.153-0.200 wide; ventral sucker preequatorial, 0.195-0.300 long, 0.180-0.233 wide, with elongated aperture but no posterolateral lobes; sucker ratio 1:1.35-1.48. Prepharynx short; pharynx 0.060-0.090 in diameter; esophagus short; cecum extending to midlevel of ovary. Gonads postequatorial. Testis entire, at about midlevel of hindbody, 0.200-0.267 long, 0.167-0.200 wide. Seminal vesicle bipartite; long tubular posterior portion extending to about midlevel of ovary; thick-walled anterior division with conspicuous circular muscles and 2 large nuclei on inner surface, protruding into lumen; pars prostatica difficult to interpret; possibly part of a narrow tube leaving muscular portion of seminal vesicle or within conspicuous mass filling genital atrium and probably corresponding to what has been called genital

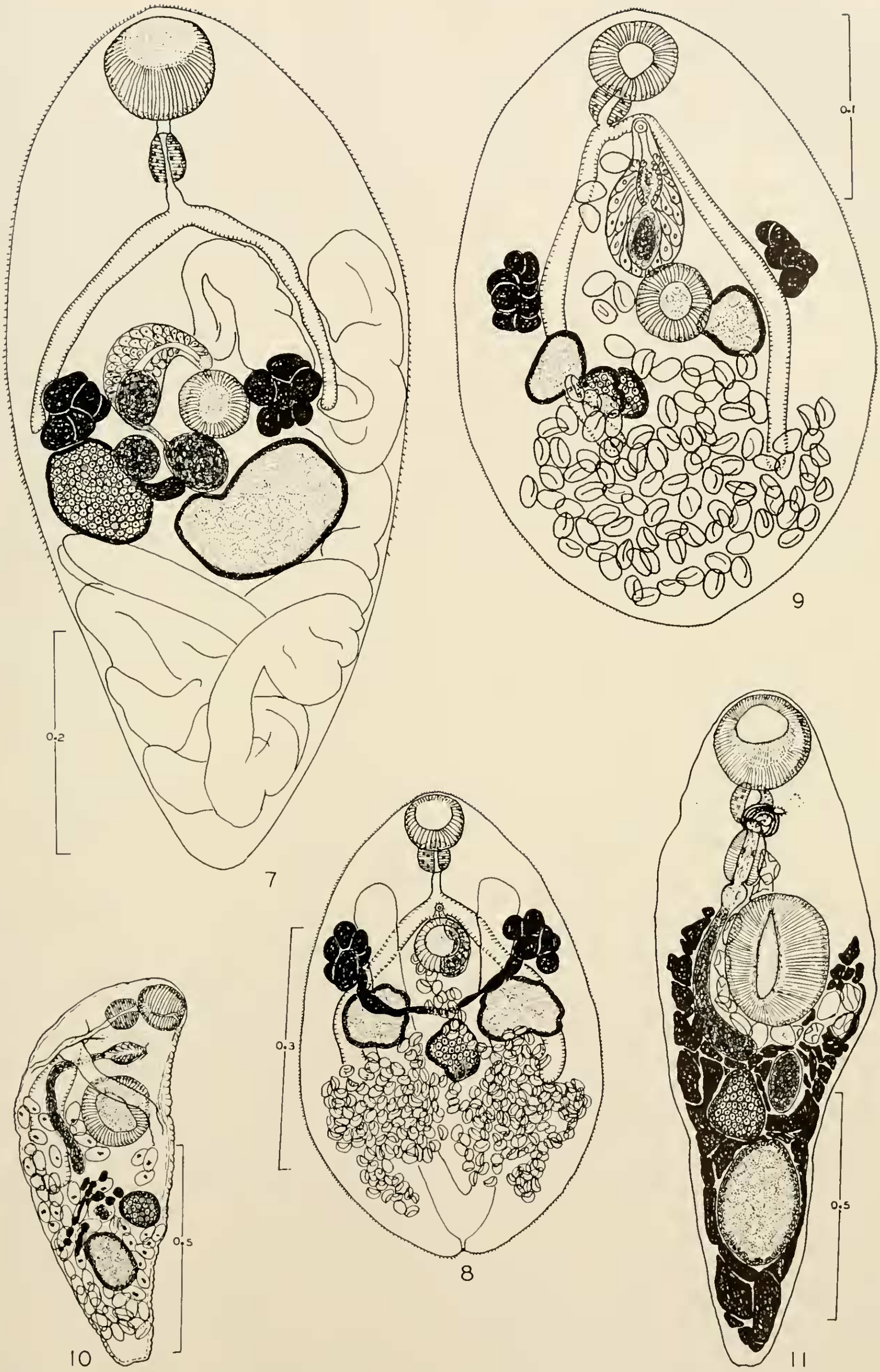


Figure 7. *Infundibulostomum anisotremi*, holotype, dorsal view. **Figure 8.** *Pseudobacciger manteri*, holotype, ventral view. **Figure 9.** *Bacciger opisthonemae*, holotype, ventral view. **Figure 10.** *Haplosplanchnus mugilis*, holotype, ventrolateral view. **Figure 11.** *Schikhobalotrema bivesicula*, holotype, ventral view.

bulb; prostate cells inconspicuous. Ovary entire or slightly irregular, 0.120-0.140 long, 0.078-0.105 wide; anterior to testis; seminal receptacle dorsolateral to ovary; uterus preovarian. Genital pore median, at pharyngeal level. Eggs few, 60-78 by 40-53 μ. Vitellaria of large follicles extending from anterior margin of ventral sucker to near posterior end of body. Excretory vesicle not observed; excretory pore terminal.

Schikhobalotrema bivesiculum differs from all other species of the genus in its conspicuous bipartite seminal vesicle. It resembles *S. acutum* and *S. adacutum* in general topography and although it has a longitudinal aperture in the acetabulum as in those species, the sucker lacks posterolateral lobes. The bipartite seminal vesicle with a thick anterior division in this species may be of generic value but the species is placed in *Schikhobalotrema* because others showing gradations in that respect may exist.

Schikhobalotrema **elongatum** n.sp.

Figure 12

Hosts: Mugil cephalus (C); *M. curema* (J).

Site: intestine.

Holotype: U.S.N.M. 60261.

Description based on 20 specimens. Body elongated, 0.734-1.49 long, 0.200-0.367 wide, with prominant cuticular rings, especially, in hindbody. Eye-spot pigment present. Oral sucker 0.090-0.150 long, 0.105-0.180 wide; ventral sucker without lobes, in anterior third or fourth of body, 0.120-0.195 in diameter, aperture circular; sucker ratio 1:1-1.32. Prepharynx about half length of pharynx; pharynx 0.060-0.075 in diameter; esophagus about as long as pharynx; cecum extending to midlevel of testis. Gonads in posterior half of body. Testis usually elongated, median, 0.167-0.366 long, 0.098-0.174 wide; seminal vesicle tubular, reaching almost midway between acetabulum and ovary; prostate cells granular, conspicuous, their ducts forming a bulbous mass just posterior to muscular genital atrium. Genital pore median, near posterior edge of pharynx. Ovary entire, anterior to testis, 0.090-0.133 long, 0.060-0.090 wide, well removed from ventral sucker except in contracted specimens; seminal receptacle dorsal, near ovarian level; uterus preovarian. Eggs 60-84 by 42-54 μ. Vitelline follicles large, extending from pharyngeal level to posterior end of body, tending to fuse in hindbody. Excretory vesicle not observed; pore terminal.

The most distinctive features of *Schikhobalotrema elongatum* are its long hindbody with prominent cuticular rings, and its well-developed bulb of prostatic ducts. In body shape, *S. elongatum* is similar to several species. *S. acutum* and *S. adacutum* have a ventral sucker with a longitudinal aperture and lateral lobes. *S. obtusum* lacks a prostatic vesicle; the genital atrium is nonmuscular and the ovary close to the acetabulum. *S. pomacentri* has an equatorial ventral sucker and *S. kyphosi* (Manter, 1947) a lobed ovary. *S. girellae* (Manter & Van Cleave, 1951) is most like *S. elongatum* but differs from that species in the extent of the seminal vesicle, in having a long tubular genital atrium and a more anterior ovary. *S. manteri* Siddiqi & Cable, 1960, differs in the distribution of the vitellaria, position of the testis and posterior extent of the uterus. *S. robustum* Pritchard & Manter, 1961, is much larger, has a thin-walled genital atrium and the genital pore on a finger-like projection.

Schikhobalotrema **heterocotylum** n.sp.

Figure 13

Host: Pseudoscarus guacamaia (C).

Site: intestine.

Holotype: U.S.N.M. 60262.

Description based on 5 specimens. Body subspherical to pyriform, 1.29-1.50 long, 0.869-0.965 wide. Cuticle thick, aspinose; eye-spot pigment present. Oral sucker 0.128-0.186 long, 0.233-0.266 wide, ventral lip with papilla bearing openings of salivary gland in forebody. Ventral sucker at midbody, 0.466-0.533 long, 0.533-0.613 wide, its interior with 2 anterior and 2 posterior tuberculated projections. Sucker ratio 1:2.6-2.8. Prepharynx short; pharynx 0.130-0.150 long, 0.105-0.135 wide; esophagus short; cecum extending to midlevel of acetabulum. Gonads in posterior third of body. Testis 0.386-0.486 long, 0.213-0.333 wide, to right of midline; seminal vesicle long, extending to posterior level of ventral sucker or slightly beyond; pars prostatica small, inconspicuous. Ovary entire to slightly lobed, 0.133-0.180 long, 0.098-0.135 wide, median, posterior to acetabulum; seminal receptacle postovarian and much larger than ovary; uterus preovarian. Genital pore ventral, near midlevel of pharynx. Eggs 84-99 by 53-75 μ. Vitelline follicles numerous, extending from midlevel of pharynx to posterior end of body. Excretory vesicle not observed.

No haplosplanchnid has been described as having an acetabulum with the tuberculated lobes characteristic of this species. Most like it in other respects is *S. brachyurum* (Manter, 1937) a paratype of which we have examined and found to lack such lobes. It further differs from *S. heterocotylum* in having a different body shape, a smaller ventral sucker and a different sucker ratio. Although similar in body shape, *S. glomerosum* Pritchard and Manter, 1961, has a smaller ventral sucker, a preacetabular ovary, more anterior testis and a well-developed metraterm.

The next species has haplosplanchnid characteristics but differs from known genera in having the ventral sucker so near the posterior end of the body that the gonads necessarily are preacetabular. In life, that sucker was nearer the posterior end of the body in our specimen than it appears in the whole mount (Fig. 14). Thus the Haplosplanchnidae is another example of families in which certain species evidently are secondarily amphistomatous. To receive the species, a new genus is erected and characterized as follows:

Haplosplanchnoides n.g.

Diagnosis: Family Haplosplanchnidae. Body with thick unarmed cuticle. Oral sucker terminal; ventral sucker near posterior end of body. Prepharynx and pharynx present; cecum single, extending to posterior end of body. Testis single, anterior to acetabulum; cirrus sac absent; seminal vesicle long and tubular. Ovary anterior to testis; seminal receptacle present; uterus pretesticular. Genital pore in anterior half of body. Vitellaria extensive, from prepharyngeal level to posterior end of body. Eggs large. Parasites in intestine of marine fishes. Type and only species:

Haplosplanchnoides hemiramphi
n.g., n.sp.
Figure 14

Host: Hemiramphus brasiliensis (J).
Site: intestine.
Holotype: U.S.N.M. 60263.

Description based on a single specimen. Body elongated, rounded at both ends, 1.73 long by 0.720 wide. Oral sucker 0.233 long, 0.267 wide; ventral sucker near posterior end of body, 0.420 long, 0.313 deep; ratio of sucker lengths 1:1.7. Prepharynx short; pharynx 0.133 long, 0.160 wide; cecum long, terminating near posterior end of body. Testis entire, 0.188 by 0.210, near anterior margin of ventral sucker; seminal vesicle long, sinuous, extending from genital pore to testis; pars prostatica and prostate cells not seen, probably obscured by vitelline follicles; ejaculatory duct short. Ovary entire, 0.153 by 0.158, a short distance anterior to testis; seminal receptacle anterodorsal to ovary; uterus short. Genital pore probably median, about midway between ovary and pharynx. Vitelline follicles large, filling most of body between prepharynx and posterior end. Eggs few, 75-84 by 60-68 μ. Excretory vesicle not observed; pore dorsal, a short distance from posterior end of body.

Although certain other haplosplanchnids have short hindbodies, their gonads are never anterior to the acetabulum except perhaps in *Schikhobalotrema glomerosum* which Pritchard and Manter (1961) described from two specimens in poor condition.

FAMILY MEGAPERIDAE Manter, 1934

Thysanopharynx elongatus Manter, 1933
Host: Lactophrys bicaudalis (C).
Site: intestine.

Megapera gyrina (Linton, 1907)
Manter, 1934

Synonyms: Distomum gyrinus Linton, 1907; *Eurypera gyrina* (Linton) Manter, 1933.
Hosts: Lactophrys bicaudalis (C); *L. tricornis* (J); **L. triqueter* (C).
Site: intestine.

Megapera **pseudogyrina** n.sp.
Figure 15

Host: Cantherines pullus (J).
Site: intestine.
Holotype: U.S.N.M. 60264.

Description based on 17 specimens. Body 0.667-1.60 long, greatest width 0.246-0.506, in forebody, gradually tapering towards posterior end; sides sometimes incurved posterior to testes; anterior end broadly rounded. Cuticular spines extremely fine, not extending posterior to testes; eye-spot pigment present. Oral sucker 0.150-0.333 long, 0.165-

0.400 wide, with histology peculiar to the family; ventral sucker 0.060-0.100 in diameter, near junction of first and second thirds of body length; sucker ratio 1:0.3-0.45. Pharynx 0.045-0.090 long, 0.130-0.150 wide with lobed anterior border; esophagus absent; ceca long and wide, opening separately through ani at posterior end of body. Testes 2, elongated, 0.120-0.333 long, 0.060-0.166 wide, symmetrical, extending posterolaterally from pharynx to about posterior level of ventral sucker, overlapping cecal arch. Seminal vesicle free in parenchyma, spherical, sometimes larger than ventral sucker, usually extending posterior to it; pars prostatica dorsal to genital atrium, small, spherical, surrounded by prostate cells. Ovary indented to trilobed, 0.053-0.150 long, 0.045-0.080 wide; seminal receptacle anterodorsal to ovary; uterus short, mostly preovarian. Genital pore median, immediately preacetabular. Vitelline follicles elongated, in two ventrolateral groups extending from near testes to posterior end of body, and 2 dorsal groups usually enmeshed in midline, extending from posterior margin of ovary to near posterior end of body. Eggs thin-shelled 48-53 by 31-33 μ. Excretory vesicle tubular as far as ovarian level.

This species is most like *Megapera gyrina* (Linton, 1907) but differs from it chiefly in body shape and the form and distribution of the vitellaria. Posterior to the testes the body tapers gradually or is moderately incurved instead of narrowing abruptly and becoming tail-like as in *M. gyrina.* Although the vitelline follicles of *M. pseudogyrina* are elongated, they are by no means as narrow, uniformly shaped, or as numerous as in *M. gyrina.*

Superorder *Epitheliocystidia* La Rue, 1957
Order *Plagiorchiida* La Rue, 1957
Suborder *Plagiorchiata* La Rue, 1957
Superfamily *Plagiorchioidea* Dollfus, 1930
FAMILY MICROPHALLIDAE Travassos, 1921

Carneophallus lactophrysi Siddiqi & Cable, 1960

Hosts: **Myrichthys acuminatus* (C); **M. oculatus* (C).
Site: intestine.

Although this species was a common parasite of eels of the genus *Myrichthys* in Curaçao, it was not found there in the trunk fish which is the type host in Puerto Rico.

Microphallus excellens (Nicoll, 1907) Baer, 1943

Synonym: Spelotrema excellens Nicoll, 1907.
Host: **Myrichthys oculatus* (C).
Site: intestine.

Fifteen worms from a single host are identified as *M. excellens* using Baer's (1943) key and that of Biguet, Deblock and Capron (1958). They differ, however, from Nicoll's specimens in being smaller (0.547-0.781 compared with 0.71-1.39) and also in having relatively larger suckers and pharynx. Belopolskaja in *Skrjabin* (1952) considers *Spelotrema feriatum* Nicoll, 1907, a synonym of *S. excellens.* The present material falls within the combined range of measurements given under those names.

A species of *Microphallus* has not hitherto been reported from a marine fish.

Superfamily *Lepocreadioidea* Cable, 1956
FAMILY LEPOCREADIIDAE Nicoll, 1934

Homalometron elongatum Manter, 1947
Host: Gerres cinereus (J).
Site: intestine.

Homalometron foliatum Siddiqi & Cable 1960

Hosts: Haemulon album (C); *H. flavolineatum* (C, J); **H. sciurus* (J); **Lutianus mahogoni* (C); **Brachygenys chrysargyreus* (C).
Site: intestine.

Thirty individuals of this species agree with the original description except that the body length is up to 3.956, the sucker ratio ranges from 1:0.70-1.03, the vitellaria may reach the anterior margin of the ovary, and egg size is 66-90 by 45-60 μ.

Crassicutis marina Manter, 1947
Host: Gerres cinereus (J).
Site: intestine.

Crassicutis **gerridis** n.sp.
Figure 16

Host: Gerres cinereus (C, J).
Site: intestine.
Holotype: U.S.N.M. 60265.

Description based on 15 specimens. Body elongated, 1.04-2.6 long, 0.400-0.710 wide.

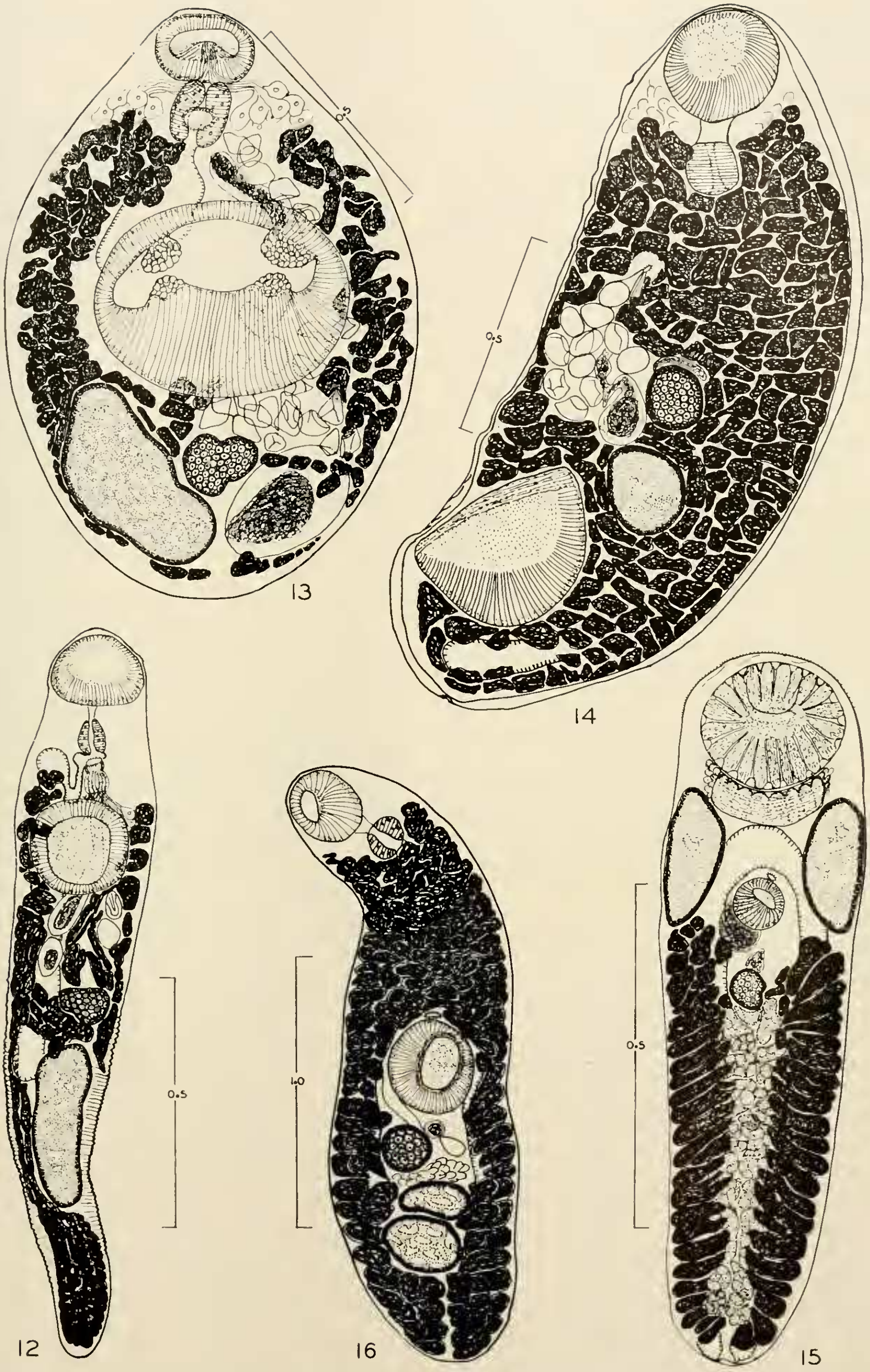


Figure 12. *Schikhobalotrema elongata*, holotype, ventral view. **Figure 13.** *Schikhobalotrema heterocotyla*, holotype, ventral view. **Figure 14.** *Haplosplanchnoides hemiramphi*, holotype, ventrolateral view. **Figure 15.** *Megapera pseudogyrina*, holotype, ventral view. **Figure 16.** *Crassicutis gerridis*, holotype, ventral view.

Long, very narrow, widely spaced spines imbedded in thick cuticle of larger specimens but not of immature ones. Eye-spot pigment present. Oral sucker 0.173-0.280 in diameter; ventral sucker equatorial, 0.206-0.400 long, 0.267-0.333 wide; sucker ratio 1:1.13-1.43. Prepharynx about 3/4 length of pharynx; pharynx 0.055-0.105 long, 0.075-0.114 wide; esophagus shorter than pharynx, intestinal bifurcation well anterior to ventral sucker; ceca long, extending almost to posterior end of body. Testes tandem, close together, 0.100-0.300 long, 0.180-0.333 wide; posttesticular space 1/6-1/8 body length. Cirrus sac absent; ejaculatory duct relatively long, opening into indistinct genital atrium; pars prostatica small, with indistinct prostate cells; seminal vesicle saccular, extending to or slightly beyond posterior edge of ventral sucker. Genital pore small, median, immediately anterior to ventral sucker. Ovary smooth, 0.100-0.233 in diameter, separated from anterior testis by Mehlis' gland; seminal receptacle small, inconspicuous, antero- or laterodorsal to ovary; Laurer's canal opens dorsally, median to ovary; uterus pretesticular; metraterm not observed. Vitellaria of large follicles extending from posterior edge of oral sucker or pharynx to posterior end of body, occupying all available space between ventral sucker and pharynx. Eggs 83-113 by 46-60 μ. Excretory vesicle short, sac-shaped, not quite reaching posterior testis.

Three species of *Crassicutis* have been described. *C. cichlasomae* Manter, 1936, from a fresh-water host, *C. marina* Manter, 1947, and *C. archosargi* Sparks & Thatcher, 1960. *C. gerridis* differs from all 3 in having a long forebody filled with vitelline follicles. In addition it differs from *C. cichlasomae* in habitat and in having tandem rather than diagonal testes. It differs from *C. archosargi* in the position of the ventral sucker and position of the gonads. *C. marina,* described from the same host in Florida and also found in this study, differs from *C. gerridis* chiefly in having a more anterior ventral sucker and much less extensive preacetabular vitellaria, differences observed in living specimens as well as whole mounts; other possible differences are the less conspicuous seminal vesicle and seminal receptacle in *C. gerridis.*

Lepidapedon trachinoti Hanson, 1950

Hosts: **Epinephelus morio* (C); *E. Striatus* (C).

Site: ceca.

The most distinctive feature of this species is the lateral depression at the left margin of the body opposite the genital pore. Our specimens agree with Hanson's description except for a slightly larger size (up to 3.76 long by 0.594 wide) and an entire rather than irregular ovary.

Lepidapedon truncatum Sogandares-Bernal, 1959

Synonym: ***Lepidapedon holocentri* Siddiqi & Cable, 1960.

Host: Holocentrus ascensionis (C, J).

Site: ceca and upper intestine.

Lepidapedon holocentri is obviously a synonym of *L. truncatum.* The descriptions of both were in press at the same time.

Neolepidapedon mycteropercae Siddiqi & Cable, 1960

Hosts: **Mycteroperca bonaci* (C); **M. venonosa* (C).

Site: intestine.

Fifty-five specimens are in general agreement with the original description of the species, based on a single specimen, but show certain variations. The vitellaria may or may not be confluent between the gonads and may reach the midlevel of the external seminal vesicle. The metraterm is muscular, the genital pore is usually posterolateral to acetabulum but may be near its midlevel. The sucker ratio is 1:1.38-1.48 and eggs measure up to 62 μ in length.

Neolepidapedon **hypoplectri** n.sp.

Figure 17

Host: Hypoplectrus unicolor (J).

Site: intestine.

Holotype: U.S.N.M. 60266.

Description based on 13 specimens. Body elongated, 1.35-2.02 long, 0.280-0.380 wide. Entire cuticle spinose; eye-spot pigment present. Oral sucker 0.090-0.112 in diameter; ventral sucker 0.063-0.083 in diameter; sucker ratio 1:0.70-0.76. Prepharynx very short; pharynx 0.033-0.054 in diameter; esophagus 2-3 times length of pharynx; intestinal bifurcation about midway between suckers; ceca extending to near posterior end of body. Testes 2, entire, 0.068-0.135

long, 0.090-0.150 wide, tandem, not close together. Cirrus sac extending well posterior to ventral sucker, containing small spherical internal seminal vesicle, large conspicuous pars prostatica and cirrus; external seminal vesicle tubular, sinuous, surrounded by prostatic cells along most of its length and extending about halfway from ventral sucker to ovary. Ovary entire, smooth, pretesticular, 0.063-0.098 long, 0.080-0.105 wide, seminal receptacle postovarian; uterus preovarian; metraterm about same length as cirrus sac. Genital atrium small; genital pore sinistral, at about midlevel of ventral sucker. Eggs 45-60 by 28-33 μ. Vitelline follicles in lateral fields, from about end of cirrus sac to posterior end of body; confluent in posttesticular space, usually between testes, rarely between ovary and anterior testis. Excretory vesicle tubular, extending to intestinal bifurcation; sphincter well developed, pore terminal.

The excretory vesicle is known to terminate between the anterior margin of the acetabulum and the intestinal bifurcation in 3 species of *Neolepidapedon* besides *N. hypoplectri: N. medialunae* Montgomery, 1957, *N. epinepheli* Siddiqi & Cable, 1960, and *N. mycteropercae* Siddiqi & Cable, 1960. The anterior extent of the vesicle is not described for *N. cablei* Manter, 1954, and *N. retrusum* (Linton, 1940). In all other species reported to date, it reaches only to the anterior testis or ovary. *N. hypoplectrus* differs from *N. cablei* chiefly in lacking the preacetabular, glandular hump-like protuberance, in sucker ratio and position of the acetabulum; from *N. retrusum* and *N. mycteropercae* in sucker ratio; from *N. epinepheli* in the anterior extent of the vitellaria, position of the genital pore and in having a smaller pharynx and narrow eggs; and from *N. medialunae* in position of the ventral sucker, extent of spination, shape of oral sucker and in having a shorter prepharynx and esophagus.

Multitestis inconstans (Linton, 1905) Manter, 1931

Synonym: Distomum inconstans Linton, 1905.

Host: Chaetodipterus faber (J).

Site: intestine.

Multitestis blenni Manter, 1931

Host: Chaetodipterus faber (J).

Site: intestine.

Multitestis chaetodoni Manter, 1947

Synonym: Distomum sp. of Linton, 1907, p. 115.

Hosts: Chaetodon capistratus (J); *C. striatus* (J).

Site: ceca and intestine.

It is of interest to note that none of the *Chaetodon* species examined in Curaçao harbored *M. chaetodoni.* It seeems to be replaced there by the next species, at least in *C. capistratus.*

Multitestis rotundus Sparks, 1954

Hosts: **Archosargus unimaculatus* (J); **Chaetodon capistratus* (C, J).

Site: intestine.

Our specimens actually agree more with those of Sogandares-Bernal and Hutton (1959b) than with the species as originally described. The vitellaria extend anteriorly as far as the pharyngeal level and sometimes to the oral sucker; the follicles may or may not be confluent posteriorly.

Opechona **chloroscombri** n.sp.

Figure 18

Synonym: Opechona sp. Siddiqi & Cable, 1960.

Host: Chloroscombrus chrysurus (J).

Site: intestine.

Holotype: U.S.N.M. 60267.

Description based on 12 mature specimens. Body elongated, rounded at both ends, 1.06-1.50 long, 0.220-0.300 wide. Entire cuticle spinose; eye-spot pigment present. Oral sucker 0.039-0.053 in diameter; ventral sucker in anterior region of mid-third of body, 0.055-0.068 long, 0.063-0.084 wide; sucker ratio 1:1.4-1.5. Prepharynx 0.030-0.098 long; pharynx 0.048-0.060 long, 0.033-0.042 wide; esophagus 0.180-0.255 long, including a posterior glandular portion (pseudesophagus) measuring 0.105-0.150 in length; ceca extend to near posterior end of body. Testes 0.068-0.100 in diameter, tandem, close together, in posterior third of body; posttesticular space 1/5-1/4 body length. Cirrus sac long, extending to about midway between acetabulum and ovary, containing small spherical internal seminal vesicle, larger pars prostatica and long cirrus; external seminal vesicle tubular, about half length of cirrus sac. Ovary entire, 0.045-0.054 long, 0.053-0.078 wide; seminal receptacle between ovary and anterior testis;

uterus preovarian; metraterm about same length as cirrus; genital pore slightly sinistral, about midway between acetabulum and intestinal bifurcation. Vitelline follicles extending from level of ventral sucker to posterior end of body, not confluent posterior to testes. Opaque eggs 45-53 by 30-36 μ. Excretory vesicle, thick-walled (epithelial), varying in anterior extent from anterior margin of acetabulum to intestinal bifuraction.

Opechona chloroscombri is most similar to *O. gracilis* (Linton, 1910) in the extent of the vitellaria and length of the excretory vesicle but differs from that species in size and ratio of suckers and the ratio of pseudesophagus to esophagus.

Opechona **sardinellae** n.sp.

Figure 19

Host: Sardinella macrophthalmus (J).
Site: intestine.
Holotype: U.S.N.M. 60268.

Description based on 9 specimens. Body 1.03-1.158 long, 0.286-0.536 in maximum width near testicular level, tapering toward anterior end; posterior extremity rounded, usually with indentation at excretory pore. Cuticle spinose, spines extending only to about intestinal bifurcation; eye-spot pigment present. Oral sucker 0.075-0.135 long, 0.105-0.150 wide; ventral sucker somewhat preequatorial, 0.066-0.113 in diameter; sucker ratio 1:0.7-0.8. Prepharynx short, pharynx massive, 0.090-0.150 in diameter; esophagus about same length as pharynx, its epithelial region (pseudesophagus) almost as long as simple anterior portion; ceca wide, reaching midway between testes and posterior end of body. Testes tandem, 0.075-0.153 long, 0.098-0.160 wide, in posterior third of body; cirrus sac extending to about midway between acetabulum and ovary, containing small internal seminal vesicle, pars prostatica which is sometimes indistinctly bipartite, and cirrus. External seminal vesicle tubular, about 2/3 length of cirrus sac. Ovary entire, 0.055-0.100 long, 0.080-0.114 wide, separated from anterior testis by seminal receptacle and vitelline reservoir; uterus pretesticular, terminating in short, muscular metraterm. Genital pore sinistral, midway between ventral sucker and intestinal bifurcation. Vitelline follicles extending from level of acetabulum to posterior end of body, rarely confluent behind testes. Eggs 58-68 by 35-45 μ. Excretory vesicle tubular, sigmoid in living specimens, crossing left cecum ventrally and extending to midlevel of pharynx; excretory pore terminal, with sphincter.

Species of *Opechona* with the extent of vitellaria and excretory vesicle more or less as in *O. sardinellae* are: *O. orientalis* (Layman, 1930) and *O. pharyngodactyla* Manter, 1940. *O. sardinellae* differs from *O. orientalis* chiefly in shape of ovary and oral sucker and in having a shorter prepharynx and esophagus, and from *O. pharyngodactyla* in lacking the finger-like projections on the pharynx and in sucker ratio. *Opechona gracilis* reported by Linton (1910) from *Clupanodon pseudohispanicus* and by Manter (1947) from *Harengula (Sardinella) macrophthalmus* is distinguished from *O. sardinellae* by extent of body spination, sucker ratio, proportion of pseudesophagus to the esophagus, size of pharynx and length of the excretory vesicle which was reported by Manter to extend only to the acetabulum. *Opechona sardinellae* differs from *O. chloroscombri* in body shape and spination, size and ratio of suckers, and length of excretory vesicle and esophagus.

Lepocreadium bimarinum Manter, 1940

*Host: *Bodianus rufa* (J).
Site: intestine.

Lepocreadium trulla (Linton, 1907) Linton, 1910

Synonym: Distomum trulla Linton, 1907.
Host: Ocyurus chrysurus (C, J).
Site: intestine.

Lepocreadium pyriforme (Linton, 1900) Linton, 1940

Synonym: Distomum pyriforme Linton, 1900.
Host: Peprilus paru (J).
Site: intestine.

Linton (1940) reported as this species trematodes from 9 hosts including *Peprilus paru*. We doubt that all of them are the same species. Our single specimen lacks eggs but otherwise agrees with Linton's description and is referred to *L. pyriforme* on the basis of its similarity to his Figure 47 of a specimen from *Palinurichthys perciformis*, the type host of *L. pyriforme*.

Lepocreadium opsanusi Sogandares-Bernal & Hutton, 1960

Hosts: **Calamus arctifrons* (J); **C. bajanado* (J).

Site: ceca and intestine.

In the extent and distribution of vitellaria, position of gonads, extent of the excretory vesicle and general topography, our numerous specimens are most like ones which Sogandares-Bernal and Hutton (1960) named provisionally as *Lepocreadium opsanusi.* In the Jamaican specimens, the body is somewhat smaller (0.346-0.586 long, 0.185-0.253 wide) as are the eggs (54-62 by 33-38 μ) and the sucker ratio is 1:0.83-1.00 whereas Sogandares-Bernal and Hutton gave a ratio of 1:1-1.85. However, their drawing of the holotype shows an acetabulum that is smaller than the oral sucker as is true of most of our specimens.

Lepocreadium **hemiramphi** n.sp.

Figure 20

Host: Hemiramphus brasiliensis (C).

Site: intestine.

Holotype: U.S.N.M. 60269.

Description based on 25 specimens. Body from pyriform to more elongated with bluntly pointed posterior end, 0.286-0.513 long, 0.160-0.200 wide. Entire cuticle spinose; eye-spot pigment present. Oral sucker 0.039-0.055 in diameter; ventral sucker in middle third of body, 0.037-0.060 in diameter; sucker ratio 1:0.91-1.00. Pharynx 0.036-0.045 long, 0.030-0.033 wide; prepharynx and esophagus about as long as pharynx; intestinal bifurcation close to acetabulum; ceca extend almost to posterior end of body. Testes 2, entire, tandem, near posterior end of body, 0.030-0.060 in diameter; cirrus sac about 1/5 body length, reaching ovarian zone, usually ovoid, containing spherical internal seminal vesicle, prominent pars prostatica and long, winding cirrus; external seminal vesicle large, spherical. Genital atrium small; genital pore anterosinistral to acetabulum. Ovary entire, median, 0.027-0.039 long, 0.030-0.048 wide; seminal receptacle postovarian; uterus short, preovarian, terminating in conspicuous, thick-walled metraterm. Eggs few (no more than 2 observed in uterus of any one worm), 45-57 by 30-37 μ. Vitelline follicles extending from esophageal level almost to posterior end of body, slightly if at all overreaching posterior testis. Excretory vesicle tubular, its anterior extent not determined; excretory pore terminal.

Lepocreadium hemiramphi is most similar to *L. floridanum* Sogandares-Bernal and Hutton, 1959 and *L. pyriforme* (Linton, 1900). It differs from both in being much smaller and more compact with the cirrus sac reaching the ovary, and in having the testes nearer the posterior end and the vitellaria extend farther anteriorly but not appreciably posterior to the testes.

Lepocreadium **truncatum** n.sp.

Figure 21

Synonym: Lepocreadium sp. Siddiqi & Cable, 1960.

Host: Ocyurus chrysurus (C).

Site: intestine.

Holotype: U.S.N.M. 60270.

Description based on 4 specimens (1 from Curaçao and 3 from Puerto Rico). Body 0.467-0.714 long, 0.293-0.393 wide, pyriform, tapering anteriorly, truncated posteriorly. Entire cuticle spinose, spines becoming sparse posteriorly; eye-spot pigment present. Oral sucker 0.053-0.075 long, 0.060-0.090 wide; ventral sucker 0.099-0.120 in diameter; sucker ratio 1:1.3-1.55. Prepharynx present; pharynx 0.045-0.060 in diameter; esophagus short; intestinal bifurcation about midway between suckers; ceca extending to posterior end of body. Testes 2, entire, tandem, 0.042-0.083 long, 0.105-0.150 wide; cirrus sac extending midway from acetabulum to ovary, containing spherical internal seminal vesicle, well developed prostatic complex and thick cirrus; external seminal vesicle saccate. Ovary 0.068-0.083 long, 0.030-0.068 wide, trilobed, to right of median line; seminal receptacle present; uterus pretesticular; metraterm distinct. Genital pore about midway between ventral sucker and intestinal bifurcation. Eggs few, 53-60 by 28-33 μ. Vitelline follicles large, extending from anterior level of ventral sucker to posterior end of body. Excretory vesicle tubular, anterior extent not determined; pore terminal.

This species is most like *L. trulla* (Linton, 1907) and *L. maris* (Caballero, 1957) but differs from them chiefly in sucker ratio and in having tandem rather than diagonal testes.

Apocreadium balistis Manter, 1947
Host: Balistes vetula (J).
Site: intestine.

Of 3 specimens, one of which was immature, none shows ridges on the testes.

Apocreadium mexicanum Manter, 1937
*Host: *Monacanthus hispidus* (J).
Site: intestine.

Our many specimens are more like those of Siddiqi and Cable (1960) from Puerto Rico than the species as originally described. The posttesticular space usually is less than half as long as the body but sometimes the 2 regions are about equal in length. Opaque eggs measure 63-71 by 42-45 μ, collapsed ones are 30-40 μ wide. The anterior limit of the vitellaria varies between the posterior and anterior margins of the ventral sucker.

Neoapocreadium coili (Sogandares-Bernal, 1959) Siddiqi & Cable, 1960
Synonym: Apocreadium coili Sogandares-Bernal, 1959.
Host: Balistes vetula (J).
Site: intestine.

Neoapocreadium angustum (Sogandares-Bernal, 1959) Siddiqi & Cable, 1960
Synonym: Apocreadium angustum Sogandares-Bernal, 1959.
Host: Lactophrys trigonus (C).
Site: intestine.

Postporus epinepheli (Manter, 1947) Manter, 1949
Synonyms: Opisthoporus epinepheli Manter, 1947; *Postporus mycteropercae* (Manter) Manter, 1949.
Hosts: Epinephelus adscensionis (C, J); *E. guttatus* (C); *E. morio* (C); *E. striatus* (C, J).
Site: intestine.

The variations observed in this species by Siddiqi and Cable (1960) are confirmed. The sucker ratio is 1:0.61-0.97 except for one of 1:0.53 in a single, apparently excessively flattened specimen from *Epinephelus striatus.*

Myzoxenus lachnolaimi Manter, 1947
Host: Lachnolaimus maximus (J).
Site: intestine.

Rhagorchis odhneri Manter, 1931
Synonym: Gargorchis varians Linton, 1940.
Host: Alutera schoepfii (J).
Site: intestine.

Manter (1931) described the excretory vesicle as being tubular but in our living specimens it was distinctly Y-shaped, bifurcating dorsal to the ventral sucker to form voluminous arms extending to the sides of the pharynx. The main excretory tubules evidently leave the stem of the vesicle and divide into anterior and posterior tubules before reaching the acetabular level.

Cadenatella **kyphosi** n.sp.

Figures 22 and 23

Host: Kyphosus sectatrix (C).
Site: intestine.
Holotype: U.S.N.M. 60271.

Description based on 13 specimens; measurements on 8 mature ones. Body elongated, 2.3-4.15 long, 0.267-0.366 wide. Cuticle spinose from anterior end almost to ventral sucker dorsally, to level of testis ventrally. Eye-spot pigment present; brownish yellow pigment scattered through parenchyma. Forebody with 14-18 midventral accessory suckers; one, 2 or rarely 3 near anterior edge of pharynx, distinctly separated from others extending from near posterior edge of pharynx to acetabulum. Oral sucker with 8 muscular preoral lobes, rather uniform in length, in a dorsal and a ventral row of 4 each; lobes not subdivided or prominently extended in either living or fixed and stained specimens; sucker 0.133-0.166 long including lobes, 0.107-0.140 wide. Ventral sucker in anterior fourth of body, 0.146-0.200 in diameter; sucker ratio 1:1.14-1.40. Prepharynx wide, about same length as pharynx; pharynx massive, pyriform, 0.150-0.220 long, 0.107-0.155 wide; esophagus very short, ceca extending to posterior end of body, joining excretory vesicle to form uroproct with terminal pore. Single testis elongated, 0.333-0.446 long, 0.127-0.167 wide, about 1/3 body length from posterior end. Cirrus sac absent; seminal vesicle long, sinuous, extending about halfway from ventral sucker to ovary; pars prostatica ovoid, near anterior edge of acetabulum; ejaculatory duct short. Genital atrium inconspicuous, genital pore midventral, immediately anterior to ventral sucker. Ovary entire, 0.080-0.133 long, 0.106-0.140 wide, anterior to testis, separated from it by vitelline reservoir; seminal receptacle of uterine type, anterior to ovary;

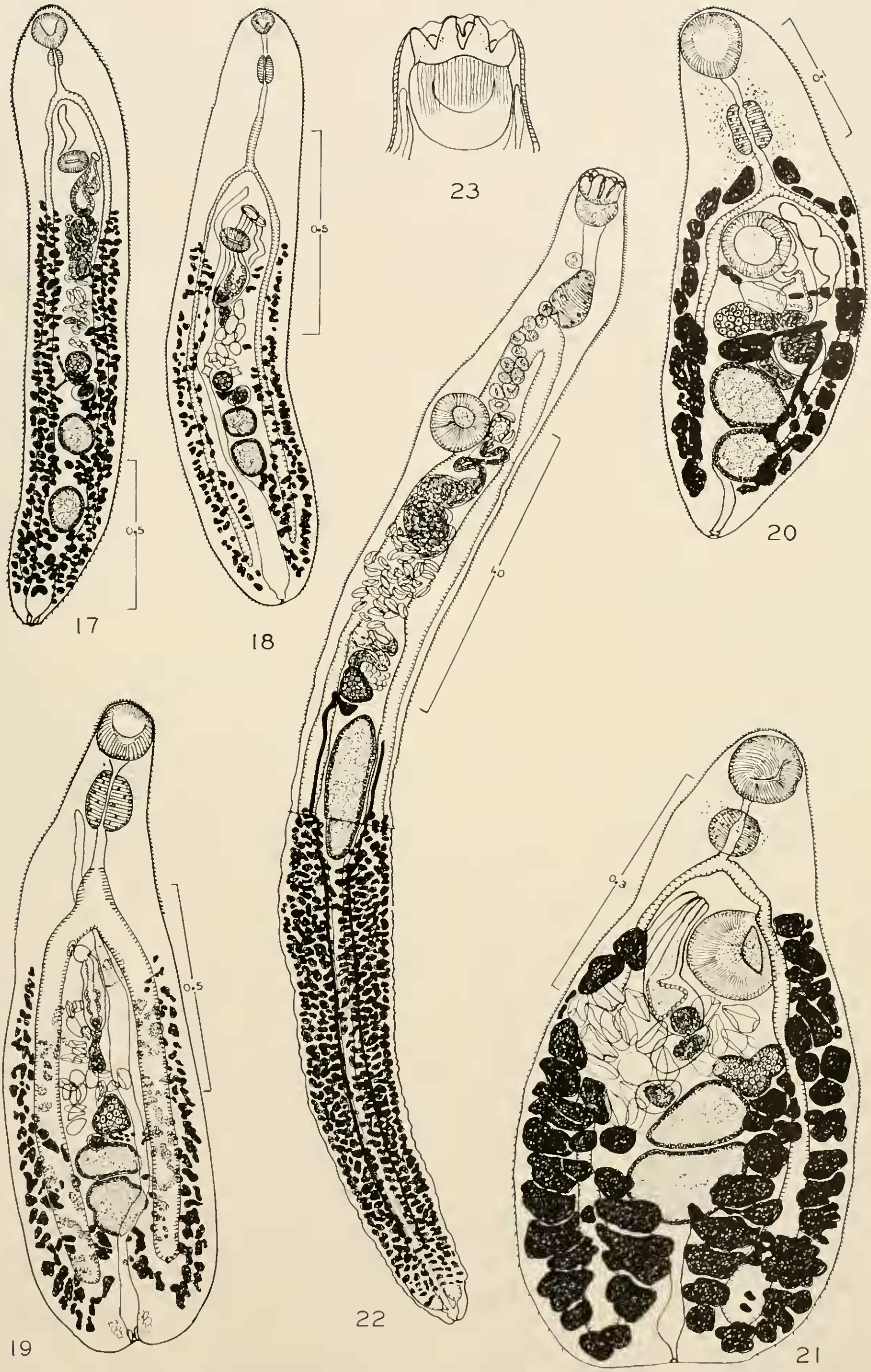


Figure 17. *Neolepidapedon hypoplectri*, holotype, ventral view. **Figure 18.** *Opechona chloroscombri*, holotype, ventral view. **Figure 19.** *Opechona sardinellae*, holotype, dorsal view. **Figure 20.** *Lepocreadium hemiramphi*, holotype, ventral view. **Figure 21.** *Lepocreadium truncatum*, holotype, dorsal view. **Figure 22.** *Cadenatella kyphosi*, holotype, ventral view. **Figure 23.** Same, oral sucker from dorsal aspect, drawn free-hand from living specimen.

Mehlis' gland near receptacle; Laurer's canal present, opening dorsal to ovary; uterus preovarian, intercecal; metraterm absent. Eggs broadly lunate, 48-68 by 22-30, usually 52-63 by 24-28 μ. Vitelline follicles numerous, extending from posterior third of testis to end of body. Excretory vesicle Y-shaped, its stem bifurcating at ovarian level to form wide arms extending to about midway between ovary and ventral sucker; excretory canals leave tips of arms to extend to sides of oral sucker and turn posteriorly, receiving first branch at prepharyngeal level; flame cells numerous. Lymphatic channels not evident but a number of ventral glands on each side of forebody have ducts in a bundle accompanying excretory canals with some at least opening at anterior end of body.

This species represents a peculiar group of trematodes known only from chubs of the genus *Kyphosus.* Uncertainty as to its affinities was mentioned earlier in this paper in connection with the Superfamily Haploporoidea. Generic concepts within the group remain to be clarified.

Dollfus (1946) described 3 species from *Kyphosus sectatrix* in Senegal and allocated each to a new subgenus in the genus *Enenterum,* naming them *E. (Enenterum) pseudaureum. E. (Cadenatella) cadenati* and *E. (Jeancadenatia) brumpti.* The subgenus *Enenterum* had 10 oral lobes, no accessory suckers, and 2 testes; *Cadenatella* had 8 oral lobes, one accessory sucker and one testis; and *Jeancadenatia* had 10 oral lobes, numerous accessory suckers, and probably one testis which Dollfus misinterpreted as 2 in his macerated specimens. Nagaty (1948) followed Manter's (1947) suggestion and raised the subgenera to generic rank.

Winter (1957) described *Jeancadenatia dohenyi* from *Kyphosus elegans* in the Mexican Pacific; it has 10 oral lobes, one testis, and only 2 accessory suckers. Sogandares-Bernal (1959) identified as *J. brumpti* 2 specimens from *K. sectatrix* at Bimini, each with but one testis. Manter (1949) described *Cadenatella americana* as having a cirrus sac but reexamination of the holotype reveals that the pars prostatica probably was misinterpreted as a cirrus sac. The presence of accessory suckers and absence of a cirrus sac seems to be correlated in these trematodes, as in the opecoelids.

We believe that the presence of accessory suckers is a generic character whereas their number distinguishes species; the same is concluded for the oral lobes some of which may be more or less distinctly subdivided in some species and not in others. *Jeancadenatia* thus is considered a synonym of *Cadenatella* which has page priority. It includes the following species:

C. cadenati Dollfus, 1946, type species
C. americana Manter, 1949
C. brumpti (Dollfus, 1946) n.comb.
  Syn. *Enenterum (Jeancadenatia) brumpti* Dollfus
    Jeancadenatia brumpti (Dollfus) Nagaty, 1948
C. dohenyi (Winter, 1957) n.comb.
  Syn. *Jeancadenatia dohenyi* Winter
C. kyphosi n.sp.

Cadenatella kyphosi is most like *C. brumpti* but differs from that species in the arrangement of the accessory suckers; number size and shape of the oral lobes; shorter prepharynx; and smaller size.

Diploproctodaeum plicitum (Linton, 1928) Sogandares-Bernal & Hutton, 1958

Synonyms: Distomum sp. of Linton, 1898 and 1905; *Psilostomum plicitum* Linton, 1928; *Bianium concavum* Stunkard, 1930; *Bianium adplicitum* Manter, 1940; *Bianium plicitum* (Linton) Stunkard, 1931.

Hosts: Spheroides spengleri (J); **S. testudineus* (J).

Site: intestine.

Diploproctodaeum baustrum (MacCallum, 1919) La Rue, 1926

Synonyms: Hemistomum haustrum MacCallum, 1919; *Bianium lecanocephalum* Pérez Vigueras, 1955.

Host: **Cantherines pullus* (C, J).

Site: intestine.

The ovary in this species is variable. MacCallum (1919) and Pérez Vigueras (1955b) show an entire or subtriangular ovary. The majority of the specimens in our collection show the ovary in various degrees of lobulation with a maximum of 5 lobes. Dr. Sogandares (personal communication) confirmed this variation in his material from Bimini. In many specimens, a few vitelline follicles extend to the mid- or anterior level of acetabulum.

Diploproctodaeum **diodontis** n.sp.

Figure 24

Host: Diodon hystrix (J).

Site: intestine.

Holotype: U.S.N.M. 60272.

Description based on 10 mature specimens. Body discoid, ventral surface concave, inrolled at sides, 0.965-1.74 long, 0.887-1.39 wide. Entire cuticle spinose; eye-spot pigment present. Oral sucker well removed from anterior end of body, 0.135-0.200 long, 0.180-0.270 wide; ventral sucker equatorial to somewhat postequatorial, 0.180-0.266 in diameter; sucker ratio 1:1-1.2. Prepharynx absent; pharynx massive, 0.120-0.150 long, 0.140-0.195 wide, usually with 8 anterior lobes; esophagus absent; ceca wide, arching from pharynx and extending posteriorly to converge at sides of posterior testis where each opens dorsally at an anus far from posterior end of body. Testes usually diagonal, rarely tandem, 0.120-0.233 long, 0.080-0.150 wide; cirrus sac extending to near midlevel of ventral sucker, usually to left of that sucker but may be displaced to right, containing spherical internal seminal vesicle, pars prostatica of about same size, and cirrus; external seminal vesicle prominent. Ovary with 10-15 distinct lobes, to left of midline, usually opposite anterior testis but may be intertesticular; seminal receptacle antero- or laterodorsal to ovary; uterus short, pretesticular, terminating in muscular metraterm. Genital atrium wide; genital pore ventral, to left of midline, immediately posterior to intestinal bifurcation. Vitellaria of numerous follicles extending in a wide, more or less circular zone from oral sucker to near posterior end of body; confluent or not at level of intestinal bifurcation. Eggs 53-62 by 30-45 μ. Excretory vesicle somewhat sigmoid, slightly overreaching ventral sucker; excretory pore mid-dorsal, between anal openings.

The discoid body shape and dorsal anal openings well removed from the posterior end of the body distinguish this species from all others in the genus *Diploproctodaeum.* Except for anal openings, it is very similar to species of *Pseudocreadium* with which it could easily be confused. Because both genera have all the characteristics of the Lepocreadiidae, there is no justification for maintaining the Diploproctodaeidae Ozaki, 1928, or Dermadenidae Yamaguti, 1958, as families distinct from the Lepocreadiidae.

Although Yamaguti (1958) gives in his key a number of features to distinguish the genera *Pseudocreadium* Layman, 1930, and *Hypocreadium* Ozaki, 1936, descriptions of their species show that differences, even at the generic level, are relative rather than absolute. Thus Yamaguti has referred *P. scaphosomum* Manter, 1940, to *Hypocreadium* but retained *P. lamelliforme* (Linton, 1907) in the genus *Pseudocreadium* when the only difference between the 2 species seems to be the shape of the external seminal vesicle. Bravo-Hollis and Manter (1957) accepted the 2 genera "on the basis of an intertesticular ovary and the uterus extending posterior to the ovary." In the new species described below, the ovary is between the testes but the uterus does not extend posterior to it. Because Sogandares-Bernal (1959) observed variations in the position of the ovary and posterior extent of the uterus in his specimens of *P. scaphosomum,* he considered *Hypocreadium* a synonym of *Pseudocreadium.* We agree with that opinion.

Pseudocreadium **lactophrysi** n.sp.

Figures 25 and 26

Synonym: Pseudocreadium sp. Siddiqi & Cable, 1960.

Hosts: Lactophrys tricornis (C); *L. trigonus* (C); *L. triqueter* (C, J).

Site: intestine.

Holotype: U.S.N.M. 60273.

Description based on 25 mature specimens. Body broadly pyriform to almost circular, 0.333-0.667 long, 0.280-0.710 wide. Entire cuticle spinose; spines partially lost in some specimens; eye-spot pigment present. Oral sucker subterminal, 0.033-0.078 long, 0.053-0.083 wide; ventral sucker subequatorial, 0.056-0.102 in diameter; sucker ratio 1:1.0-1.3. Prepharynx absent; pharynx 0.033-0.068 in diameter; esophagus about same length as pharynx; ceca arching to enclose reproductive system, ending about midway between testes and posterior end of body. Testes symmetrical, irregular, 0.083-0.165 in diameter; cirrus sac to right, not extending posterior to midlevel of ventral sucker, containing large internal seminal vesicle, bipartite pars prostatica and relatively long cirrus. External seminal vesicle an elongated sac overlapping cirrus sac posterodorsally. Ovary irregular to trilobed, 0.045-0.090 long, 0.060-0.120 wide, immediately posterior to ventral sucker, median or rarely submedian; seminal receptacle large, ovoid, to left of ventral sucker; uterus short, not extending posterior to ovary; metraterm about half length of cirrus sac. Vitelline follicles numerous, extending from level of oral sucker to posterior end of body, confluent dorsally at intestinal bifurcation and posterior to ovary. Eggs few, 58-68 by 33-45 μ. Genital pore to left of midline, at level of, or immediately posterior to intestinal bifurcation. Excretory vesicle tubular, extending to posterior edge of ovary; excretory pore dorsal, far removed from posterior end of body. Siddiqi and Cable (1960) reported the flame cell formula for their immature specimen to be $2[(2+2+2) + (2+2)]$.

Manter (1945) pointed out that Linton (1907) confused 2 species as *Distomum lamelliforme.* Linton's Figure 75 probably is *P. lactophrysi;* thus 3 rather than 2 species may have been misinterpreted as a single one by Linton.

The broadly pyriform body in combination with a uterus that does not extend posterior to the ovary distinguish *Pseudocreadium lactophrysi* from all species of *Pseudocreadium* except *P. spinosum* Manter, 1940. A comparison of the present material with Manter's description and 3 specimens of *P. spinosum* reveals the following: *P. lactophrysi* is a smaller species but its measurements overlap those of *P. spinosum;* the anterior end is somewhat pointed rather than truncated; a prepharynx is absent; the testes are more anterior and the seminal receptacle is ovoid rather than tubular.

Pseudocreadium anandrum Manter, 1947

Hosts: **Calamus arctifrons* (J); **C. bajanado* (J).

Site: intestine.

Pseudocreadium lamelliforme (Linton, 1907) Manter, 1946

Synonym: Distomum lamelliforme Linton, 1907.

Host: Balistes vetula (J).

Site: intestine.

Pseudocreadium galapagoensis Manter, 1946

Synonym: Pseudocreadium scaphosomum Manter, 1940 in part.

Host: **Balistes ringens* (C).

Site: intestine.

Sogandares-Bernal (1959) described *Pseudocreadium biminensis* from 2 specimens and indicated a close resemblance to *P. galapagoensis.* For his species, he gave 5 distinguishing features which, except for the anterior extent of the vitellaria, are variable in our 17 specimens from Curaçao. Sucker ratios are intermediate, being 1:0.70-1.00 compared with 1:0.51-0.89 for *P. biminensis* and 1:1-1.13 for *P. galapagoensis;* the external seminal vesicle is usually median and transverse but lateral and diagonal in a few of our specimens. In the posterior extent of the cirrus sac, the Curaçao material is like *P. galapagoensis,* but in the position of the ventral sucker, it is like *P. biminensis.* In all 17 specimens, however, the vitellaria extend to the mid- or anterior level of the oral sucker and thus provide the only distinguishing feature between the 2 species. Dr. Manter examined one of our specimens and verified its identification. Minute spines which were observed on the cirrus in living material were not reported by Manter but were seen in a paratype provided by him. The excretory vesicle is pyriform, with its narrower anterior portion receiving 2 canals which extend slightly anterior to the ventral sucker and divide into anterior and posterior secondary tubules, each joined by 2 large groups of flame cells.

Dermadena lactophrysi Manter, 1946

Synonym: Distomum lamelliforme Linton, 1907 in part.

Hosts: Lactophrys tricornis (C); *L. trigonus* (C); *L. triqueter* (C).

Site: intestine.

Superfamily *Opecoeloidea* Cable, 1956

FAMILY OPECOELIDAE Ozaki 1925

Hamacreadium oscitans Linton, 1910

Synonyms: Podocotyle breviformis Manter, 1940; ***Pseudoplagioporus brevivitellus* Siddiqi & Cable, 1960.

Hosts: Anisotremus virginicus (J); **Archosargus unimaculatus* (J); **Bathystoma aurolineatum* (J); **Calamus calamus* (J); **Haemulon album* (C); **H. bonariense* (J); **H. melanurum* (C); *H. sciurus* (J).

Site: intestine.

Our specimens from the various hosts show that the anterior extent of the excretory vesicle depends on the degree of maturity of the trematodes; it reaches the posterior margin of the acetabulum in the immature specimens and only to the ovarian level in mature ones. Reexamination of a paratype of *Pseudoplagioporus brevivitellus* indicates that species to be a synonym of *H. oscitans.*

Hamacreadium mutabile Linton, 1910
Hosts: Lutianus apodus (J); *L. griseus* (J); *L. jocu* (J).
Site: intestine.

Hamacreadium consuetum Linton, 1910
Host: Haemulon sciurus (J).
Site: intestine.

Helicometrina nimia Linton, 1910
Hosts: Haemulon sciurus (J); **Hypoplectrus indigo* (J); **Lachnolaimus maximus* (J); **Lutianus jocu* (J); **Platophrys lunatus* (J); **Spheroides spengleri* (J).
Site: intestine.

Helicometrina trachinoti Siddiqi & Cable, 1960
Host: **Trachinotus glaucus* (J).
Site: intestine.

Six specimens from one fish agree with the original description of the species except that in all of them, the cirrus sax extends to the posterior margin of the ventral sucker.

Helicometra equilata (Manter, 1933) Siddiqi & Cable, 1960
Synonym: Stenopera equilata Manter, 1933.
Host: Holocentrus ascensionis (J).
Site: intestine.

Helicometra execta Linton, 1910
Host: **Halichoeres pictus* (J).
Site: intestine.

Horatrema crassum Manter, 1947
Synonym: Manteriella crassa (Manter) Yamaguti, 1958.
Hosts: Eques acuminatus (J); **E. punctatus* (C).
Site: intestine.

Pinguitrema lobatum Siddiqi & Cable, 1960
Host: Gerres cinereus (J).
Site: intestine.

Pseudopecoeloides carangi (Yamaguti, 1938) Yamaguti, 1940
Synonym: Cymbephallus carangi Yamaguti, 1938.
Hosts: **Caranx crysos* (C); *C. ruber* (C, J).
Site: intestine.

Pseudopecoeloides equesi Manter, 1947
Hosts: Eques acuminatus (C); **E. punctatus* (C).
Site: intestine.

Pseudopecoeloides gracilis Manter, 1947
Host: Selar crumenophthalmus (J).
Site: intestine.

Neopecoelus scorpaenae Manter, 1947
Host: Scorpaena plumieri (C).
Site: intestine.

Our material is identified as this species even though the anal openings could not be confirmed by careful examination of living specimens or whole mounts. In some stained specimens, strands were seen extending posteriorly from the end of each cecum. In other respects, there is close agreement with the original description of the species except that interruption of the vitellaria at the level of each testis occurred in a minority of our specimens.

Opecoeloides brachyteleus Manter, 1947
Hosts: Upeneus maculatus (C, J); *U. martinicus* (C, J).
Site: intestine.

Opecoeloides elongatus Manter, 1947
Hosts: Upeneus maculatus (C, J); *U. martinicus* (C, J).

Opecoeloides vitellosus (Linton, 1900) Von Wicklen, 1946
Synonyms: Distomum vitellosum Linton, 1900; *Anisoporus manteri* Hunninen & Cable, 1940; *Opecoeloides manteri* (Hunninen & Cable) Hunninen & Cable, 1941; **Cymbephallus vitellosus* (Linton) Linton, 1934.
Host: **Epinephelus adscensionis* (J).
Site: intestine.

Von Wicklen (1946) pointed out that Linton had identified as *Distomum vitellosum* more than one species and that *Opecoeloides vitellosus* should be restricted to trematodes that agree with the descriptions given originally by Linton (1900) and later by Hunninen and Cable (1941).

Pseudopecoelus barkeri Hanson, 1950

Hosts: Holocentrus ascensionis (C, J); **H. vexillarius* (C).

Site: intestine.

According to the key to the genus *Pseudopecoelus* given by Manter (1954), our specimens could be either *P. barkeri* Hanson, 1950, or *P. tortugae* (Manter, 1934). In general body shape and indented testes, they are more like *P. tortugae* but egg measurements (45-52 by 27-32 μ) are more like those of *P. barkeri.* The sucker ratio is intermediate (1:1.7-2.3). Thus the 2 species seemingly differ only in egg size.

Pseudopecoelus **holocentri** n.sp.

Figure 27

Synonym: ***Pseudopecoelus elongatus* of Hanson, 1950, nec (Yamaguti, 1938)

Host: Holocentrus ascensionis (C).

Site: intestine.

Holotype: U.S.N.M. 60274.

Description based on 2 specimens. Body slender, 2.45-3.28 long, 0.600-0.667 wide. Oral sucker 0.120-0.130 long, 0.128-0.135 wide; ventral sucker in anterior fourth of body, 0.240-0.280 in diameter, without papillae; sucker ratio 1:2-2.15. Prepharynx short; pharynx 0.105 long, 0.090-0.114 wide; esophagus 0.098-0.112 long; ceca end blindly near posterior end of body. Testes 2, tandem, lobed, not contiguous, 0.293-0.346 long, 0.213-0.273 wide; seminal vesicle tubular, extending about 1/3 distance from ventral sucker to ovary; ejaculatory duct short; pars prostatica indistinct. Ovary pretesticular, slightly irregular, 0.133-0.166 in diameter; uterine seminal receptacle, Mehlis' gland and uterus preovarian; metraterm well-developed. Genital pore sinistral, near anterior margin of pharynx. Eggs 52-54 by 27-30 μ. Vitelline follicles extending from near posterior level of ventral sucker to the posterior end of body, interrupted opposite gonads. Excretory vesicle extending to ovarian level; pore terminal.

The only other species of *Pseudopecoelus* with vitellaria interrupted opposite the gonads is *P. elongatus* (Yamaguti, 1938). That species differs from *P. holocentri* in having a smaller pharynx, a different sucker ratio (1:1.56 compared with 1:2-2.15) and a longer posttesticular space.

Some of the specimens which Hanson (1950) reported as *P. elongatus* have been examined and found to agree with the present species except in having somewhat less irregular gonads.

Pseudopecoelus **gymnothoracis** n.sp.

Figure 28

Host: Gymnothorax moringa (C).

Site: intestine.

Holotype: U.S.N.M. 60275.

Description based on 8 specimens. Body pyriform to linguiform, 1.40-1.85 long, 0.637-0.830 wide. Cuticle smooth. Oral sucker 0.113-0.133 long, 0.120-0.153 wide. Ventral sucker 0.200-0.233 long, 0.233-0.273 wide; sucker ratio 1:1.7-2.1. Prepharynx short; pharynx 0.038-0.060 in diameter; esophagus 3-5 times length of pharynx; intestinal bifurcation about midway between suckers; ceca converge posteriorly, ending blindly at about midlevel of posttesticular space. Testes 2, extremely lobed, constricted medially, 0.113-0.266 long, 0.333-0.440 wide. Cirrus sac absent; seminal vesicle tubular, extending well posterior to acetabulum but not reaching ovary; pars prostatica weakly developed, prostate cells few; ejaculatory duct short. Ovary lobed, pretesticular, submedian, 0.100-0.120 long, 0.173-0.200 wide; uterine seminal receptacle, Mehlis' gland and uterus preovarian; Laurer's canal present; metraterm well-developed. Genital atrium small, genital pore sinistral, at about midesophageal level. Eggs 54-69 by 30-45 μ, usually 63-67 by 37-42. Vitelline follicles numerous, extending along entire length of ceca, confluent at intestinal bifurcation. Excretory vesicle tubular, extending to ovarian level.

The combination of highly lobed and medially constricted testes with vitelline follicles broadly confluent at the intestinal bifurcation distinguishes this species from all others in the genus *Pseudopecoelus.*

Pseudopecoelus **minutus** n.sp.

Figure 29

Host: Doratonotus megalepis (C).

Site: intestine.

Holotype: U.S.N.M. 60276.

Description based on 6 specimens, measurements on 4 mature ones. Body elongated, rounded at both ends, 0.606-0.720 long, 0.180-0.233 wide. Oral sucker 0.063-0.075 in diameter; ventral sucker at junction of anterior and middle third of body, 0.105-0.135 in diameter; sucker ratio 1:1.7-2.0.

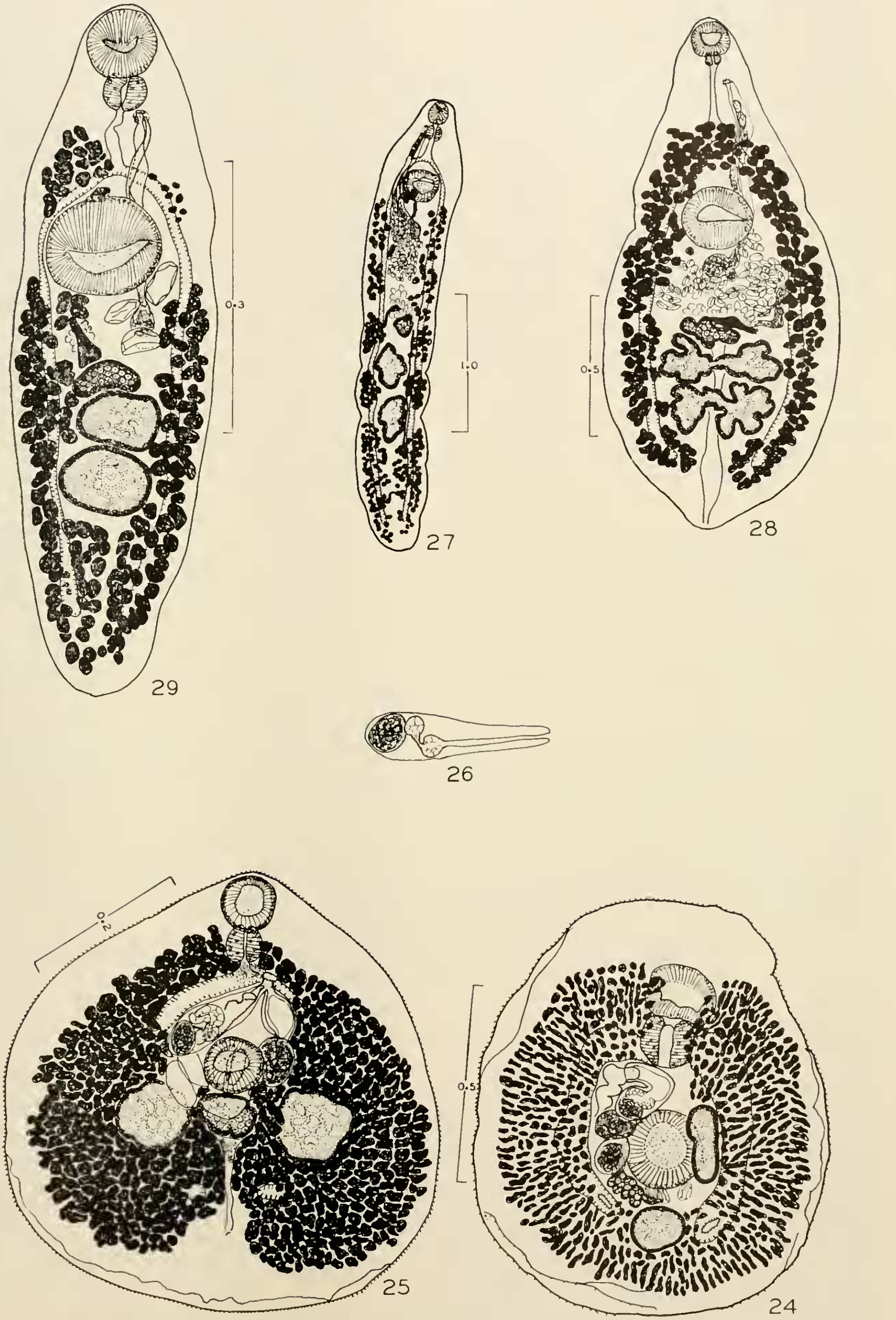


Figure 24. *Diploproctodaeum diodontis*, holotype, dorsal view. **Figure 25.** *Pseudocreadium lactophrysi*, holotype, ventral view. **Figure 26.** Same, cirrus sac of another specimen drawn free-hand. **Figure 27.** *Pseudopecoelus holocentri*, holotype, dorsal view. **Figure 28.** *Pseudopecoelus gymnothoracis*, holotype, ventral view. **Figure 29.** *Pseudopecoelus minutus*, holotype, ventral view.

Prepharynx absent; pharynx 0.030-0.040 long, 0.042-0.048 wide; esophagus 1-2 times length of pharynx; ceca end blindly a short distance from posterior end of body. Testes 2, tandem, entire, contiguous, 0.045-0.120 in diameter; seminal vesicle long, reaching about midway between ventral sucker and ovary; pars prostatica not evident. Ovary pretesticular, subtriangular, smooth, 0.030-0.075 in diameter; Mehlis' gland, uterine seminal receptacle and uterus preovarian; metraterm well-developed. Genital atrium muscular; genital pore sinistral, near posterior margin of pharynx. Eggs few, 45-54 by 22-30 μ. Vitelline follicles extending anterior to ventral sucker, usually interrupted lateral to acetabulum. Excretory vesicle tubular, extending to level of ovary; excretory formula $2[(2+2) + (2+2)] = 16$ flame cells.

Only *Pseudopecoelus gibbonsiae* Manter and Van Cleave, 1951, shares with this species the combined features of an entire ovary and vitellaria that extend anterior to the acetabulum. However, *P. gibbonsiae* is much larger (2.26-2.55 by 0.643-0.780) and its eggs almost twice the size of those of *P. minutus.*

The pygmy wrasse which harbors this species lives in clumps of rockweed in close association with the snail, *Columbella mercatoria,* and an amphipod which probably serve as intermediate hosts. A minute opecoelid cercaria, to be described elsewhere, develops in that snail and was observed to penetrate and encyst in the amphipod.

Coitocaecum sp.

Figure 30

Host: Labrisomus bucciferus (J).
Site: intestine.
Deposited specimen: U.S.N.M. 60277.

Description based on a single specimen. Body elongated, rounded at both ends, 0.750 by 0.267. Cuticle smooth. Oral sucker 0.067 by 0.084; ventral sucker subequatorial, 0.126 by 0.150, with transverse aperture; sucker ratio 1:1.84. Prepharynx short; pharynx 0.045 by 0.065; esophagus 0.115 long; intestinal bifurcation about midway between pharynx and acetabulum; cyclocoel gut extending to near posterior end of body. Testes tandem, contiguous, 0.045-0.050 long, 0.065-0.072 wide; seminal vesicle pyriform, preacetabular; followed by a narrow duct leading to inconspicuous cirrus sac anterior to arch of left cecum; content of cirrus sac not evident; genital pore sinistral, at esophageal level. Ovary pretesticular, slightly dextral, 0.045 by 0.065. Mehlis' gland preovarian; seminal receptacle absent; uterus not extending to posterior testis; metraterm simple. Eggs collapsed, 48-56 by 27-33 μ. Vitellaria extending from esophageal level to posterior end of body, confluent in posttesticular space but not at intestinal bifurcation.

This species is described and figured but not named because only one specimen in poor condition was found.

FAMILY OPISTHOLEBETIDAE
Fukui, 1929

Opistholebes diodontis Cable, 1956

Host: Diodon hystrix (C, J).
Site: intestine.

Pachycreadium crassigulum (Linton, 1910) Manter, 1954

Synonyms: Lebouria crassigula Linton, 1910; *Plagioporus crassigulus* (Linton) Price, 1934.

Hosts: **Calamus arctifrons* (J); *C. bajanado* (J); **Archosargus unimaculatus* (J).
Site: intestine.

Superfamily Allocreadioidea Nicoll, 1934
FAMILY GORGODERIDAE Looss, 1901

Xystretrum solidum Linton, 1910

Synonyms: Catoptroides aluterae MacCallum, 1917; *Catoptroides magnum* MacCallum, 1917; *Macia pulchra* Travassos, 1921; *Xystretrum pulchrum* (Travassos) Manter, 1947; *Xystretrum papillosum* Linton, 1910.

Hosts: **Balistes vetula* (J); **Cantherines pullus* (J); **Canthigaster rostratus* (C); **Lactophrys tricornis* (J); *Spheroides testudineus* (J).
Site: urinary bladder and kidney ducts.

The effect of crowding on the size of this species, mentioned by Manter (1947), was shown by the more than 100 specimens with which the kidney ducts and bladder of one *Canthigaster rostratus* were literally stuffed.

Phyllodistomum **pomacanthi** n.sp.

Figure 31

Host: Pomacanthus arcuatus (J).
Site: posterior intestine.
Holotype: U.S.N.M. 60278.

Description based on a single specimen. Body foliate, sides inrolled ventrally, 3.28

long, 1.49 in maximum width, at level of posterior testis. Oral sucker 0.334 by 0.374; ventral sucker slightly preequatorial, 0.267 by 0.240; sucker ratio 1:0.71. Pharynx absent; esophagus 0.188 long; ceca wide, extending almost to excretory pore. Testes 2, diagonal, intercecal, lobed, separated by coils of the uterus; anterior testis 0.266 by 0.333, to left of midline; posterior testis 0.280 by 0.306, 0.70 from posterior end of body; seminal vesicle anterior to genital pore, globular, wall poorly defined; prostate cells free in parenchyma; ejaculatory duct short, curves from seminal vesicle posteriorly to enter thick-walled genital atrium; genital pore about midway between intestinal bifurcation and acetabulum. Ovary pretesticular, indented or irregular, to right of midline, 0.240 by 0.200; seminal receptacle absent; Mehlis' gland between vitellaria; uterus extending to near ends of ceca; metraterm well-developed. Eggs few, 24-36 by 14-23 μ. Vitellaria 2 lobed masses, close together but separated by uterus, symmetrically placed, a short distance posterior to ventral sucker. Excretory vesicle not evident; pore dorsal, some distance from posterior end of body.

Phyllodistomum pomacanthi is most like *P. carangis* Manter, 1947, but differs from that species chiefly in being much smaller, and in having lobed testes, a more posterior ventral sucker and ceca extending farther posteriorly.

FAMILY ZOOGONIDAE Odhner, 1911

The present study includes species belonging to the genera *Diplangus, Deretrema, Steganoderma* and *Diphtherostomum.* Skrjabin (1957) has placed all but *Diphtherostomum* in the family Steganodermatidae Dollfus, 1952, in which the vitellaria are more extensive and the eggs thicker-shelled than in the Zoogonidae. He also erected the superfamily Zoogonoidea to include those families. Yamaguti (1958) assigned *Diplangus* to the family Callodistomidae Poche, 1926, but left the others in the Zoogonidae. Until those arrangements can be evaluated on the basis of life history studies, we prefer to leave all 4 genera in the Zoogonidae and, tentatively, in the superfamily Allocreadioidea.

Diplangus paxillus Linton, 1910

Hosts: Anisotremus virginicus (J); *Haemulon sciurus* (J); **Gerres cinereus* (J).
Site: intestine.

Diplangus parvus Manter, 1947

*Host: *Haemulon sciurus* (J).
Site: intestine.

Deretrema fusillum Linton, 1910

*Host: *Mycteroperca bonaci* (C).
Site: intestine.

Steganoderma nitens (Linton, 1898) Manter, 1947

Synonyms: Distomum nitens Linton, 1898; *Lecithostaphylus nitens* (Linton) Linton, 1940; ***Steganoderma elongatum* Manter, 1947.
*Host: *Strongylura ardeola* (C).
Site: intestine.

Variations in our 3 specimens overlap features used by Manter (1947) to separate *Steganoderma elongatum* from *S. nitens.* Reexamination of type specimens shows that the genital pore in *S. nitens* is more lateral than Linton (1898) figured and that its relatively far anterior position in *S. elongatum* is due to contraction of the forebody.

A striking feature of this species, not mentioned by either Linton or Manter, is the presence of conspicuous glands occupying the full width of the body from near the vitellaria to a short distance anterior to the acetabulum. They were seen in Manter's type specimen but could not be recognized with certainty in Linton's because of its condition. On each side, anterior to those glands, is a group of several less conspicuous ones with ducts extending anteriorly in a distinct bundle to separate and open at clusters of pores on the anterior margin of the oral sucker.

Steganoderma hemiramphi Manter, 1947

Figure 32

Hosts: Hemiramphus brasiliensis (C, J); *Gerres cinereus* (J).
Site: intestine.

That the larva of this species is an ophthalmoxiphidiocercaria is evident from the presence of eye-spot pigment in the forebody and a stylet (Fig. 32) in the oral sucker of one of 2 specimens from Curaçao. In known zoogonid life histories, the larva has a stylet but no tail or eye-spots. In the Monorchiidae, cercariae with eye-spots have a well developed tail whereas the absence of eye-spots is usually accompanied by more or less reduction of the tail. Should that situation apply to the Zoogonidae, the life history of *Steganoderma hemiramphi* could be decisive in determining the affinity of its family to others, a matter that is still obscure.

Steganoderma atherinae (Price, 1934) Manter, 1947

Synonym: Lecithostaphylus atherinae Price, 1934.

Hosts: Hepsetia stipes (J); **Strongylura timucu* (C).

Site: intestine.

The single specimen from Curaçao, although from a new host, is in close agreement with the species as described elsewhere in the Caribbean region. However, none of many individuals of *Hepsetia stipes* examined in Curaçao harbored this species whereas it was found in almost all *H. stipes* in Jamaica.

Diphtherostomum **anisotremi** n.sp.

Figure 33

Host: Anisotremus virginicus (J).

Site: intestine.

Holotype: U.S.N.M. 60279.

Description based on 8 specimens. Body plump, tapering toward both ends, 0.440-0.767 long, 0.173-0.267 wide. Cuticle of forebody with large spines; hindbody smooth. Oral sucker 0.060-0.090 in diameter; ventral sucker equatorial to slightly postequatorial, somewhat quadrangular, 0.120-0.210 in diameter; sucker ratio 1:2-2.35. Prepharynx absent; pharynx 0.026-0.037 in diameter; esophagus 3-4 times length of pharynx; ceca not quite reaching midlevel of acetabulum. Testes 2, symmetrical to diagonal, immediately posterior to or overlapping posterior margin of ventral sucker; cirrus sac arcuate, elongated, 0.195-0.233 long, 0.039-0.060 wide, extending to and sometimes overlapping anterior margin of acetabulum; containing bipartite seminal vesicle, ovoid pars prostatica, prostate cells and spiny cirrus. Genital pore sinistral, just posterior to level of intestinal bifurcation. Ovary smooth, dorsal to acetabulum, 0.064-0.105 long, 0.050-0.083 wide; seminal receptacle postovarian; uterus occupying most of hindbody; metraterm muscular, spiny, about same length as cirrus sac. Eggs very thin-shelled, 27-36 by 9-14 μ. Vitellaria in 2 masses, 0.030-0.078 in diameter, near posterior margin of acetabulum. Excretory vesicle short, sac-shaped; pore terminal.

This species hesitantly is reported as new because of its similarity to *Diphtherostomum americanum.* However, Manter (1947) described that species as having a very short esophagus and a cirrus sac with a width of 1/2-3/4 its length whereas in *D. anisotremi,* the esophagus is at least 3 times as long as the pharynx and the cirrus sac is about 4 times as long as wide. The figure of a trematode identified by Sogandares-Bernal and Hutton (1959b) as *D. americanum* shows an elongated cirrus sac but a short esophagus.

FAMILY MONORCHIIDAE Odhner, 1911

The status of *Genolopa* Linton, 1910, *Proctotrema* Odhner, 1911, *Lasiotocus* Looss, 1907, and other related genera has been reviewed by many authors including Yamaguti (1934), Hopkins (1941), Manter (1942), Nagaty (1948) and more recently by Thomas (1959) and Manter and Pritchard (1961). We accept the genus *Genolopa* for species with atrial spines as suggested by Manter and Pritchard. These authors also suggested that *Lasiotocus* be separated from *Proctotrema* on the basis of an entire ovary versus a 3- or 4-lobed one. In some trematodes this character is variable. In the hemiurid, *Dichadena acuta,* for instance, the ovary may be entire or distinctly 4-lobed. Moreover, lobation may be a matter of degree which can vary with handling of specimens or with their age. However, our material can be allocated between *Lasiotocus* and *Proctotrema* as distinguished by Manter and Pritchard and, for that reason, the validity of both genera is accepted at this time. Actually *Lasiotocus* was never published by Looss as a formal name; instead it was mentioned in a subjunctive sense in criticizing the Rules of Nomenclature. However facetious the intent of Looss may have been, the Law of Priority establishes the validity of such names. Thus *Lasiotocus* would take priority over *Proctotrema* if those genera are considered to be synonymous.

Genolopa ampullacea Linton, 1910

Synonym: ***Genolopa longicaudata* Siddiqi & Cable, 1960.

Hosts: Bathystoma striatum (J); *Haemulon album* (J); **H. bonariense* (J); *H. flavolineatum* (C, J); **H. melanurum* (C); *H. sciurus* (J).

Site: ceca and intestine.

Siddiqi and Cable (1960) described *Genolopa longicaudata* from *Odontoscion dentex* and, in a key, distinguished it from *G. ampullacea* on the basis of having a posttesticular space "3 or 4 times length of testis" and a metraterm sac "reaching well posterior to ventral sucker." Our more abundant material shows that these features are highly variable; *G. longicaudata* accordingly is reduced to synonymy with *G. ampullacea.*

Genolopa brevicaecum (Manter, 1942) Manter and Pritchard, 1961

Synonym: Paraproctotrema brevicaecum Manter, 1942.

Host: Caranx bartholomaei (J).

Site: intestine.

Seventeen specimens from 2 fish are in close agreement with Manter's description and measurements. The majority of the worms are elongate, spindle-shaped but a few are pyriform. They also confirm the presence of the atrial spines reported by Manter and Pritchard (1961). In most specimens, the spines were difficult to distinguish from those on the cirrus but 2 worms with that organ retracted, show a ring of spines around the genital atrium. The metraterm is unspined.

Lasiotocus longicaecum (Manter, 1940) Yamaguti, 1953

Synonym: Proctotrema longicaecum Manter, 1940.

Host: Anisotremus virginicus (J).

Site: ceca and intestine.

Lasiotocus truncatus (Linton, 1910) Thomas, 1959

Synonyms: Genolopa truncatum Linton, 1910; *Proctotrema truncatum* (Linton) Manter, 1940.

*Hosts: *Bathystoma aurolineatum* (J); **Brachygenys chrysargyreus* (C); **Calamus calamus* (J); *Haemulon album* (C); **H. bonariense* (J); *H. flavolineatum* (C, J); *H. sciurus* (J); **Lutianus mahogoni* (C).

Site: ceca and intestine.

Lasiotocus longovatus (Hopkins, 1941) Thomas, 1959

Synonyms: Genolopa longovatum Hopkins, 1941; *Proctotrema longovatum* (Hopkins) Manter, 1942.

*Hosts: *Bathystoma aurolineatum* (J); **Haemulon bonariense* (J); **H. flavolineatum* (C); **H. sciurus* (J).

Site: ceca and intestine.

Seventy trematodes are referred to this species on the basis of egg size and other measurements, length of ceca and general topography of organs. We did not observe the urn-shape described by Hopkins (1941) in either living or mounted specimens. However, Hopkins states (p. 401) "This is almost certainly the same species as the specimen shown in Figure 223 of Linton (1910) under the name '*Monostomum* sp.'." Obviously, he was referring to Linton (1905) since Figure 223 of Linton's 1910 paper represents a bucephalid. Our material is very similar to Linton's in the shape of the body and oral sucker.

Proctotrema **pritchardae** n.sp.

Figure 34

Host: Haemulon album (C).

Site: intestine.

Holotype: U.S.N.M. 60280.

Description based on 2 specimens. Body elongated, rounded at both ends, 1.158 to 1.22 long, 0.40 wide. Cuticular spines extend along entire length of body; eye-spot pigment absent. Oral sucker somewhat funnel-shaped to spherical, 0.142-0.160 long, 0.172-0.180 wide; ventral sucker in middle third of body, 0.105-0.113 long, 0.090-0.098 wide; sucker ratio 1:0.60-0.64. Prepharynx short; pharynx 0.072-0.075 long, 0.075-0 083 wide; esophagus about same length as pharynx; intestinal bifurcation about midway between pharynx and ventral sucker; ceca long, extending to near posterior end of body. Gonads in middle third of body. Testis median, entire, 0.150-0.246 in diameter; cirrus sac 0.233-0.255 long, 0.105 wide, to right of midline, extending to posterior margin of ovary; containing spherical seminal vesicle, tubular pars prostatica and cirrus with small, inconspicuous spines. Ovary with 3 or 4 distinct lobes, to right of midline, immediately anterior to, or overlapped by testis. Metraterm sac 0.210-0.213 long, 0.105-0.109 wide, consisting of large posterior vesicle without spines and smaller spinose anterior portion, separated by sphincter; metraterm spines distinct, about 12 μ long, larger than those of cirrus. Uterus voluminous, mostly posttesticular; distal end entering spiny portion of metraterm sac just anterior to sphincter. Genital atrium unarmed, genital pore median, about midway between ventral sucker and intestinal bifurcation. Eggs numerous, 18-21 by 10-12 μ. Vitellaria in lateral groups of 9-10 follicles each extending from anterior margin of ovary to midlevel of testis. Excretory vesicle tubular, anterior extent not determined; pore terminal.

Manter and Pritchard (1961) recognize the following species of *Proctotrema: P. bacilliovatum* Odhner, 1911, *P. macrorchis,* Yamaguti, 1934, *P. plectorhynchi* Yamaguti, 1934, *P. chaetodipteri* (Thomas, 1959), *P. himezi* (Yamaguti, 1951), *P. parvum* Manter, 1942, and *P. latum* (Manter, 1942). *Proctotrema pritchardae* differs from *P. bacilliovatum, P. plectorhynchi,* and *P. macrorchis* chiefly in having smaller eggs, longer ceca, and in the shape of the oral sucker; from *P. chaetodipteri* in body shape and length of posttesticular space; from *P. himezi* in having longer ceca; from *P. parvum* in having smaller eggs and much longer ceca, and from *P. latum* in body shape and accompanying topography of internal structures.

The species is named in honor of Mrs. Mary Hanson Pritchard in recognition of her work in the field of trematodology.

Proctotrema **anisotremi** n.sp.

Figure 35

Host: Anisotremus virginicus (J).
Site: ceca and intestine.
Holotype: U.S.N.M. 60281.

Description based on 10 specimens. Body oval, 0.500-0.714 long, 0.267-0.400 in maximum width, at level of vitellaria. Entire cuticle spinose, eye-spot pigment absent. Oral sucker 0.090-0.113 long, 0.105-0.135 wide; ventral sucker somewhat preequatorial, 0.055-0.067 long, 0.060-0.075 wide; sucker ratio 1:0.52-0.70. Prepharynx very short; pharynx subspherical, 0.038-0.051 in diameter; esophagus very short; ceca extending just posterior to testis. Gonads in middle third of body. Testis entire, to right of midline, 0.120-0.180 long, 0.099-0.155 wide; cirrus sac crescent-shaped, to right of midline, 0.140-0.195 long, 0.060-0.090 wide, extending to posterior margin of acetabulum or slightly beyond, containing large spherical seminal vesicle, short tubular pars prostatica and cirrus with spines about 8 μ long. Ovary immediately pretesticular, at level of ventral sucker, with 3 almost separate lobes; uterus filling posttesticular space and left side of hindbody, joining metraterm sac immediately posterior to sphincter. Metraterm sac smaller than cirrus sac, 0.113-0.160 long, 0.045-0.075 wide, rarely extending posterior to ventral sucker; consisting of large, posterior vesicle without spines separated from a smaller anterior spinose division by a sphincter; metraterm spines slightly larger than those of cirrus. Genital atrium unarmed, genital pore median, about midway between acetabulum and intestinal bifurcation. Eggs thin-shelled, 17-20 by 9-11 μ. Vitellaria in 2 lateral groups of 8 or 9 follicles each, extending from about midlevel of acetabulum to that of testis. Excretory vesicle not observed; pore terminal.

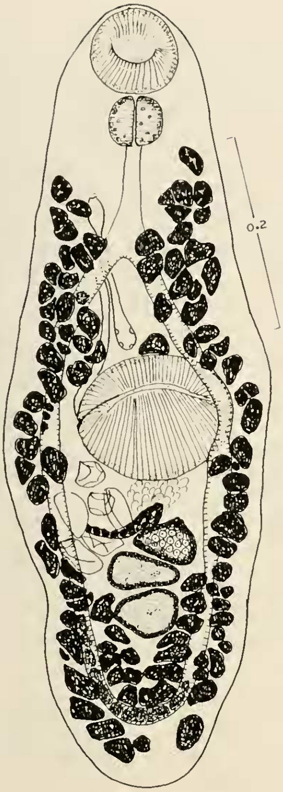
Proctotrema anisotremi is to be compared with *P. parvum* and *P. latum* which have a more or less spherical oral sucker. It differs from *P. parvum* in having smaller eggs, longer ceca and large cirrus sac, and in the position of the testis. Although described from the same host as *P. anisotremi, P. latum* differs in having a characteristically broad shape emphasized by Manter (1942), a proportionally larger cirrus sac extending posterior to ventral sucker, a more anterior genital pore, and longer ceca. Similarities include shape of oral sucker, position of testis, and lobation and position of ovary. *P. anisotremi* differs from *P. pritchardae* in shape of ovary, in position of testis and in having shorter ceca.

Chrisomom **decapteri** n.sp.

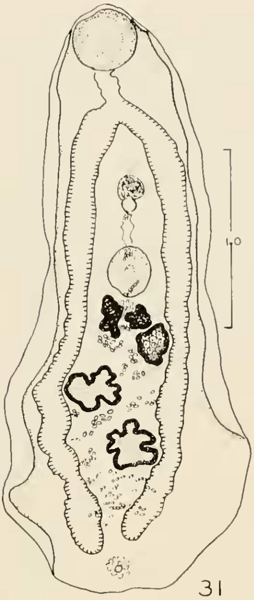
Figures 36 and 37

Host: Decapterus macarellus (C).
Site: intestine.
Holotype: U.S.N.M. 60282.

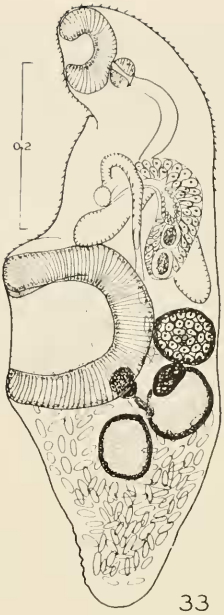
Description based on 6 specimens. Body elongated, rounded at both ends, 0.900-1.50 long, 0.300-0.400 wide (one additional specimen without eggs measured 0.772 by 0.220). Cuticular spines numerous to posterior edge of ventral sucker, then become sparse and shortly disappear. Eye-spot pigment present. Oral sucker transversely elongated, 0.045-0.063 long, 0.060-0.090 wide; ventral sucker about 1/3 body length from anterior end, 0.084-0.090 long, 0.054-0.084 wide; sucker ratio 1:1-1.15. Prepharynx about half length of pharynx; pharynx 0.053-



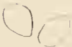
30



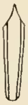
31



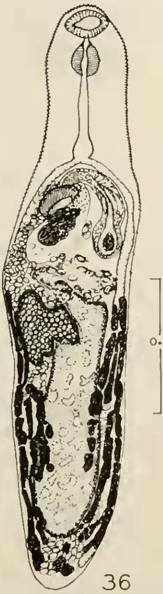
33



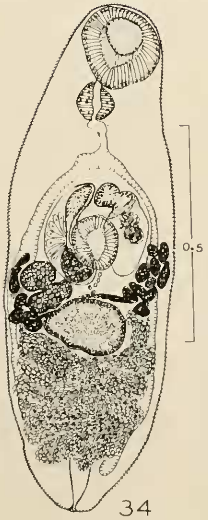
37



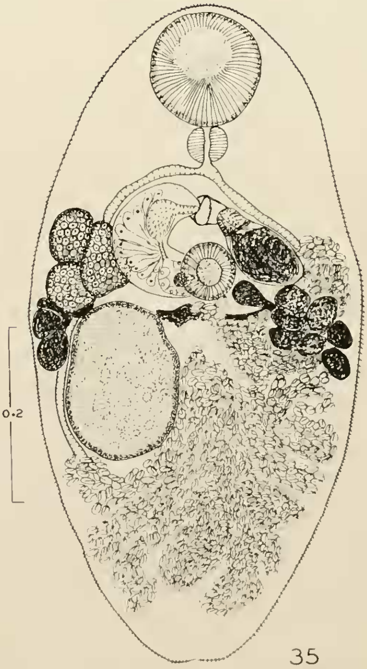
32



36



34



35

Figure 30. *Coitocaecum* sp., dorsal view. **Figure 31.** *Phyllodistomum pomacanthi*, holotype, dorsal view. **Figure 32.** Stylet of *Steganoderma hemiramphi*, drawn free-hand from living specimen. **Figure 33.** *Diphtherostomum anisotremi*, holotype, ventrolateral view. **Figure 34.** *Proctotrema pritchardae*, holotype, ventral view. **Figure 35.** *Proctotrema anisotremi*, holotype, ventral view. **Figure 36.** *Chrisomon decapteri*, holotype, dorsal view. **Figure 37.** Same, eggs enlarged.

0.083 in diameter; esophagus 2-2.5 times length of pharynx; ceca long, extending to near posterior extremity. Testis elongated, almost half body length; cirrus sac to right of midline, 0.150-0.374 long, 0.050-0.064 wide, containing spherical seminal vesicle, tubular pars prostatica and cirrus with small spines 9-12 μ long. Ovary irregularly lobed, to left of and usually overlapping testis anteriorly. Metraterm sac almost as large as cirrus sac, consisting of posterior vesicle with a few scattered spines and anterior division with numerous spines similar to those of cirrus. Uterus extending posterior to testis, overlapping it ventrally and entering metraterm sac near its anterior spiny portion. Genital atrium small, without spines; its pore median, preacetabular. Vitellaria in lateral fields, extending from anterior edge of ovary or posterior margin of cirrus sac to tips of ceca; follicles elongated, tending to fuse. Eggs 20-24 by 12-17 μ, rounded at one end, tapering at other (Fig. 37). Excretory vesicle sac-shaped, very short; pore terminal.

This species is so similar to *C. tropicum* (Manter, 1940) that further collections of *C. tropicus* from the Pacific might prove the 2 to be identical. The main differences, which may be due to development in different host species, are the larger and more elongated testis, slightly more extensive vitellaria and a somewhat more anterior ovary in *C. decapteri*. Similarities concern such details as shape of the eggs, the presence of 3 or 4 large spines in the posterior portion of the metraterm sac, extent of spination and measurements. Manter (1940a) described a very short, Y-shaped excretory vesicle in *C. tropicum* whereas it was observed to be short but sac-shaped in living specimens of *C. decapteri;* Manter may have interpreted the expanded main excretory ducts as part of the vesicle. In living *C. decapteri,* the uterus was seen to join the metraterm sac at its anterior, more spinose portion whereas Manter described that junction as being at the posterior end of the sac. We studied the type specimen of *C. tropicus* and concluded that the uterus enters the metraterm sac as in *C. decapteri.* Dr. Manter reexamined the specimen and agreed with that interpretation. Thus the diagnosis of the genus must be emended as follows:

Genus *Chrisomom* emended

Monorchiidae: Body elongated; esophagus more than twice length of pharynx; testis single, elongated, near posterior end of body; cirrus sac and metraterm sac spinose; ovary irregularly lobed; uterus extending posterior to testis or not, joining more spinose anterior portion of metraterm sac; vitelline follicles numerous, extending most of length of hindbody but not reaching acetabulum; excretory vesicle sac-shaped, short; parasites in intestine of marine fishes. Type species: *C. tropicus* (Manter, 1940) Manter & Pritchard, 1961 (Synonym: *Telolecithus tropicus* Manter); other species: *C. decapteri* n.sp.

A single specimen from *Selar crumenophthalmus* from Jamaica is in agreement with the measurements and general topography of both species of *Chrisomon* except that the testis, due to distortion and poor fixation, is more anterior, and the cirrus sac overlaps the metraterm covering it more or less completely. Its identification, therefore, remains undetermined.

Postmonorchis orthopristis Hopkins, 1941

Synonym: Pristisomum orthopristis (Hopkins) Yamaguti, 1958.

Hosts: **Gerres cinereus* (J); **Haemulon album* (J); **H. flavolineatum* (C, J); **H. sciurus* (J).

Site: intestine.

Pseudohurleytrema eucinostomi (Manter, 1942) Yamaguti, 1954

Synonym: Hurleytrema eucinostomi Manter, 1942.

Hosts: **Eucinostomus pseudogula* (J); *Gerres cinereus* (C).

Site: intestine.

Our specimens differ from Manter's only in having somewhat smaller eggs (22-26 by 12-16 μ compared with 26-28 by 20). Siddiqi and Cable (1960) reported the same species from Puerto Rico; in their specimens, eggs measured 27-30 by 11-15 μ (unpublished data).

Hurleytrematoides chaetodoni (Manter, 1942) Yamaguti, 1954

Synonym: Hurleytrema chaetodoni Manter, 1942.

Hosts: Chaetodon capistratus (C, J); *C. striatus* (J).

Site: intestine.

Hurleytrematoides **curacaensis** n.sp.

Figures 38 and 39

Hosts: Chaetodon capistratus (C); *Chaetodon ocellatus* (C).

Site: intestine.

Holotype: U.S.N.M. 60283.

Description based on 20 specimens. Body elongated, more rounded posteriorly, 0.880-1.26 long, 0.175-0.267 wide. Entire cuticle densely spinose; eye-spot pigment present. Oral sucker 0.053-0.075 in diameter; ventral sucker in anterior fourth or third of body, 0.045-0.060 in diameter; sucker ratio 1:0.8-0.9. Prepharynx very short; pharynx 0.030-0.039 long, 0.039-0.054 wide; esophagus 2-3 times length of pharynx; intestinal bifurcation well anterior to ventral sucker; ceca long, extending to midlevel of posttesticular space or slightly beyond. Gonads median, in about middle third of hindbody. Testis entire, 0.143-0.246 long, 0.113-0.173 wide. Posttesticular space 0.240-0.426 long. Cirrus sac well-developed, to right of midline, 0.158-0.195 long, 0.040-0.50 wide, containing a bipartite seminal vesicle, a short pars prostatica and a cirrus with needle-like spines, 8-11 μ long. Ovary entire, pretesticular, 0.067-0.100 in diameter; seminal receptacle not evident; uterus mainly posttesticular, coils mostly transverse; metraterm sac absent; metraterm well-developed, 0.083-0.105 long, 0.030-0.033 wide; entire length with spines 7-10 μ long, similar in shape to those of cirrus. Genital atrium without spines; genital pore median, immediately preacetabular. Eggs 27-33 by 16-23 μ, exclusive of single unipolar filament, 1-1.5 times length of egg. Vitellaria with 10-15 follicles on each side, well posterior to acetabulum, mostly pretesticular, a few sometimes extending to midlevel of testis. Excretory vesicle tubular; its pore terminal.

This species is very similar to *H. chaetodoni.* Both are from *Chaetodon capistratus* and one individual harbored both trematodes. *H. curacaensis* differs from *H. chaetodoni* mainly in having a smaller ventral sucker and wider eggs with much shorter filaments. The uterine coils tend to be more transverse than longitudinal and they lack the strand-like appearance characteristic of *H. chaetodoni*. The eggs of *H. chaetodoni* are highly variable in length. Exclusive of the filament, they measure 37-42 by 15-17 μ in our specimens. A single specimen reported from Puerto Rico by Siddiqi and Cable (1960) has eggs measuring 52-54 by 15-16 (unpublished data). Sogandares-Bernal and Sogandares (1961) gave a length of 30-32 and suggested that it may vary with populations. In *H. coronatum* Manter and Pritchard, 1961, the filament is 10-15 times the length of the egg. *H. malaboensis* Velasquez, 1961, has a longer egg filament (7-8 times length of egg), apparently a non-spiny cirrus and longer ceca.

The next species could be assigned to the genus *Hurleytrematoides* if it had one instead of 2 testes. Hence a new genus is erected for it, and diagnosed as follows:

Diplohurleytrema n.g.

Monorchiidae: subfamily Hurleytrematinae: Body spinose, elongated; eye-spot pigment absent. Acetabulum preequatorial; ceca short; esophagus long. Testes 2, diagonal; cirrus sac long, containing bipartite seminal vesicle and spiny cirrus. Ovary entire, pretesticular, in anterior half of body; seminal receptacle present; metraterm sac absent; uterus occupying most of hindbody. Vitelline follicles lateral, mostly in anterior half of body. Genital pore preacetabular. Eggs with single unipolar filaments. Excretory vesicle tubular. Parasitic in intestine of marine fishes. Type and only species:

Diplohurleytrema brevicaecum

n.g., n.sp.

Figure 40

Host: Echidna catenata (C).

Site: intestine.

Holotype: U.S.N.M. 60284.

Description based on 25 specimens. Body elongated, rounded anteriorly, tapering posteriorly, 0.566-1.25 long, 0.213-0.407 wide, Entire cuticle spinose, with spines becoming smaller posteriorly; eye-spot pigment absent. Oral sucker 0.107-0.180 long, 0.135-0.200 wide; ventral sucker preequatorial, 0.083-0.146 long, 0.090-0.160 wide; sucker ratio 1:0.70-0.80. Prepharynx absent; pharynx 0.039-0.070 in diameter; esophagus thick-walled, 3-4 times length of pharynx, usually sinuous, surrounded by gland cells; ceca short, terminating in zone of anterior testis. Testes 2, entire, usually diagonal, rarely almost symmetrical or nearly tandem, 0.083-0.200 in diameter; anterior testis to right of midline, posterior testis slightly to left. Cirrus sac 0.233-0.467 long (1/3-1/2 body length), 0.045-0.080 wide; slightly to left of midline; containing bipartite seminal vesicle, very small and indistinct pars prostatica and long cirrus armed with minute spines, difficult to see in stained specimens but evident in living material. Ovary entire, to left of midline, anterior to testes; seminal receptacle large, posterodorsal to ovary, overlapping tip of left cecum; Mehlis' gland posteromedian to ovary; Laurer's canal opens dorsal to posterior end of cirrus sac; uterus strand-like in appearance, filling a large portion of the posttesticular space and terminating in muscular, thick-walled metraterm with finely stippled lining (spines ?). Genital atrium spacious; its pore median, immediately posterior to intestinal bifurcation. Eggs 30-37 long by 13-17 μ wide, exclusive of single unipolar filament 2-3 times length of egg. Vitellaria in lateral groups of 25-30 follicles each, extending from posterior level of pharynx to midlevel of anterior testis. Excretory vesicle tubular, extending to anterior testis; pore terminal.

Diplomonorchis **myrophitis** n.sp.

Figures 41 and 42

Host: Myrophis punctatus (J).

Site: intestine.

Holotype: U.S.N.M. 60285.

Description based on 3 specimens. Body oval, 0.887-1.062 long, 0.347-0.513 wide. Cuticle with spines close together anteriorly becoming sparse posteriorly. Eye-spot pigment present. Oral sucker 0.097-0.108 long, 0.105-0.113 wide; ventral sucker in middle third of body length, 0.072-0.075 long, 0.054-0.072 wide; sucker ratio 1:0.63-0.70. Prepharynx absent; pharynx 0.045-0.053 in diameter; esophagus about as long as pharynx; ceca extending short distance posterior to testes. Gonads in middle third of body. Testes 2, 0.113-0.140 long, 0.108-0.167 wide, entire, symmetrical, lateral portions extracecal. Cirrus sac to right of acetabulum, 0.200-0.253 long, 0.090-0.100 wide, extending posteriorly to mid- or posterior level of ovary, enclosing seminal vesicle, small inconspicuous pars prostatica, and spiny cirrus. Metraterm sac 0.167-0.213 long, 0.067-0.090 wide, posterior 3/5 non-spiny, anterior part spinose; spines of metraterm and cirrus wedge-shaped 15-17 μ long. Ovary distinctly trilobed, to right of midline, 0.113-0.133 long, 0.063-0.098 wide; seminal receptacle absent; Mehlis' gland posteromedian to cirrus sac; uterus voluminous, mainly posttesticular, entering median side of spinose anterior portion of metraterm sac. Genital atrium unarmed, but appears to be spinose when occupied by partly everted cirrus; genital pore midway between acetabulum and intestinal bifurcation. Eggs numerous, 20-24 by 15-17 μ. Vitellaria in lateral groups of 10-12 follicles, extending from about midacetabular level to ends of ceca. Excretory vesicle tubular; pore terminal.

In both *Diplomonorchis leiostomi* Hopkins, 1941, and *D. bivitellosus* (Manter, 1940) the testes are extracecal and the ceca extend almost to the posterior end of the body whereas in *D. myrophitis* the ceca are overlapped by the testes and terminate a short distance posterior to them. Other differences are the more anterior position of the testes and distribution of the vitellaria in *D. myrophitis.*

Diplomonorchis **micropogoni** n.sp.

Figure 43

Hosts: Micropogon furnieri (J); *Archosargus unimaculatus* (J).

Site: intestine.

Holotype: U.S.N.M. 60286.

Description based on 17 specimens. Body oval to pyriform, 0.233-0.620 long, 0.186-0.420 wide. Entire cuticle spinose; eye-spot pigment present. Oral sucker 0.046-0.083 long, 0.066-0.098 wide; ventral sucker in middle third of body, 0.037-0.067 in diameter; sucker ratio 1:0.61-0.84. Prepharynx absent; pharynx 0.022-0.037 long, 0.027-0.053 wide; ceca terminating near posterior margin of testes. Testes 2, symmetrical, extracecal, immediately postequatorial, 0.054-0.166 long, 0.038-0.080 wide; cirrus sac 0.090-0.180 long, 0.045-0.090 wide, to right of midline, extending short distance posterior to ventral sucker; containing spherical seminal vesicle, short tubular pars prostatica and cirrus with spines. Metraterm sac 0.083-0.105 long, 0.035-0.042 wide, with large, unarmed posterior vesicle and anterior portion with a few spines 6-8 μ long, similar to those of cirrus. Ovary 4-lobed, 0.060-0.165 long, 0.053-0.068 wide, partly anterior to, and partly overlapping level of right testis; uterus voluminous, occupying almost all available space posterior to intestinal bifurcation; entering metraterm sac near anterior spinose end. Vitelline follicles relatively large, in 2 lateral groups, coinciding with or slightly exceeding zone occupied by gonads. Eggs numerous, thick-shelled, 22-30 by 14-18 μ, usually 24-27 by 15-17. Excretory vesicle tubular; pore terminal.

Worms from some hosts could be separated into 2 size groups but otherwise were identical. The presence of such groups may be expected occasionally because monorchiid cercaria may emerge from, and reenter the same clam to encyst in large numbers. Thus various age groups of adult worms would result from the host's feeding on infected clams at different times.

This species is distinguished from *D. leiostomi* and *D. bivitellosus* by its short ceca and the extent of the uterus. It further differs from *D. bivitellosus* in the distribution of the vitellaria, sucker ratio and egg size, and from *myrophitis* in body shape and size, extracecal position of testes, more extensive uterus and in having fewer spines in the metraterm.

Diplomonorchis **hopkinsi** n.sp.

Figure 44

Host: Micropogon furnieri (J).
Site: intestine.
Holotype: U.S.N.M. 60287.

Description based on 16 specimens. Body oval, 0.247-0.380 long, 0.180-0.233 wide. Entire cuticle spinose; eye-spot pigment absent. Oral sucker 0.040-0.053 long, 0.052-0.070 wide; ventral sucker just within middle third of body length, 0.033-0.039 in diameter; sucker ratio 1:0.65-0.80. Prepharynx absent; pharynx 0.025-0.035 in diameter; esophagus short; ceca extending just posterior to testes. Gonads mainly postequatorial. Testes 2, entire, 0.037-0.068 in diameter, symmetrical to somewhat oblique, mainly extracecal; cirrus sac to right of midline, 0.084-0.130 long, 0.038-0.045 wide, extending at least to midlevel of ovary, containing spherical seminal vesicle, pars prostatica and relatively long spiny cirrus. Metraterm sac indistinct; its spines and those of cirrus minute, difficult to see. Ovary indistinctly 4-lobed. Immediately anterior to right testis which it may overlap; uterus voluminous, filling most available space posterior to intestinal bifurcation, entering metraterm sac near its spinose anterior region. Genital atrium wide, unarmed; genital pore median, approximately midway between acetabulum and intestinal bifurcation. Vitellaria 4-6 follicles on each side, mainly dorsomedian to testes, rarely extending anteriorly to midlevel of ovary. Eggs small, thin-shelled, 13-15 by 9-11 μ. Excretory vesicle tubular; its pore terminal.

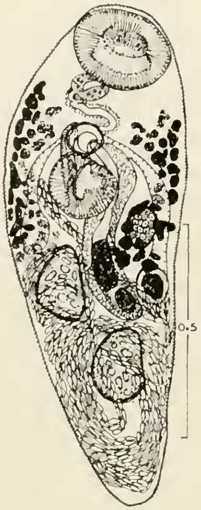
This species is named in honor of Prof. S. H. Hopkins. Because it and *D. micropogoni* were found together in the same host individual, they were not immediately recognized as being distinct species. Later we found that *D. hopkinsi* lacked eye-spot pigment, had an indistinct metraterm sac, and contained much smaller eggs. Hopkins did not mention eye-spot pigment in describing *D. leiostomi* but our examination of the type revealed its presence. Cercaria of the Monorchiidae, unlike most other families, may or may not have eye-spots whose pigment can be readily found in the adults. Even so, it is unexpected to find in the same genus, species with or without such pigment, but there may be other such instances as many descriptions are not explicit in that matter.

Diplomonorchis **sphaerovarium** n.sp.

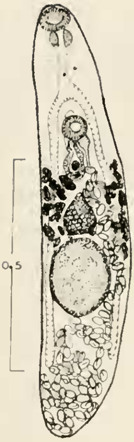
Figures 45 and 46

Host: Spheroides testudineus (J).
Site: intestine.
Holotype: U.S.N.M. 60288.

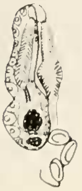
Description based on 15 specimens. Body oval to elongated, rounded at both ends, 0.984-1.41 long, 0.386-0.579 wide. Entire cuticle spinose, with spines becoming sparse posteriorly; eye-spot pigment present. Large glands in forebody, characteristic of many monorchiids, especially prominent. Oral sucker 0.105-0.120 long, 0.135-0.153 wide; ventral sucker about one-third body length from anterior end, 0.080-0.108 long, 0.099-0.120 wide; sucker ratio 1:0.7-0.82. Prepharynx absent; pharynx 0.054-0.067 in diameter; esophagus shorter than pharynx; ceca relatively long, extending to about middle of posttesticular space. Gonads equatorial. Testes 2, entire, symmetrical, 0.100-0.150 long, 0.068-0.105 wide; cirrus sac elongated, on right, 0.200-0.330 long, 0.066-0.090 wide, extending to ovarian zone, containing large, spherical seminal vesicle, small pars prostatica and cirrus with spines 8-10 μ long. Metraterm sac 0.133-0.226 long, 0.070-



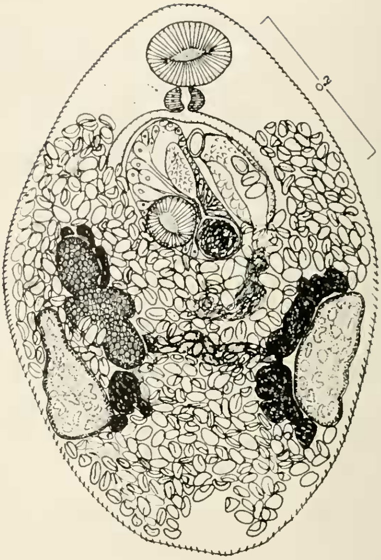
40



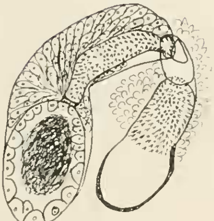
38



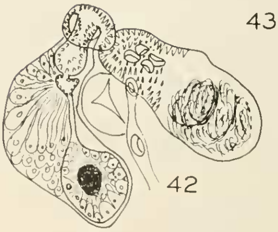
39



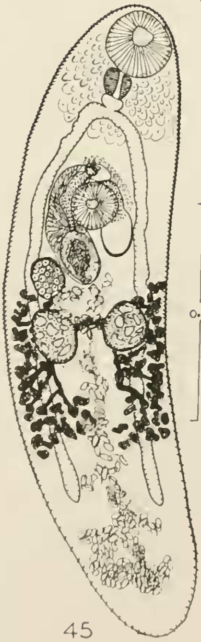
43



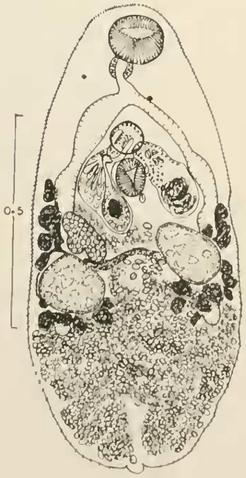
46



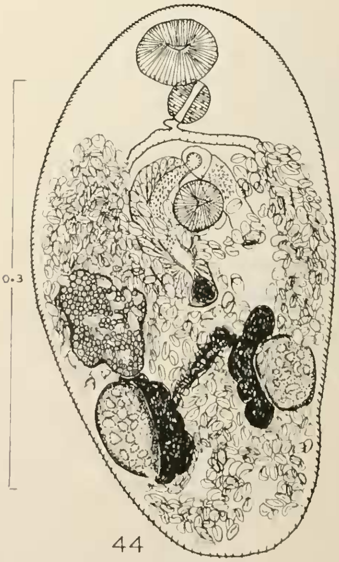
42



45



41



44

Figure 38. *Hurleytrematoides curacaensis*, holotype, ventral view. **Figure 39.** Same, terminal reproductive organs enlarged. **Figure 40.** *Diplohurleytrematoides brevicaecum*, holotype, ventral view. **Figure 41.** *Diplomonorchis myrophitis*, holotype, ventral view. **Figure 42.** Same, terminal reproductive organs enlarged. **Figure 43.** *Diplomonorchis micropogoni*, holotype, ventral view. **Figure 44.** *Diplomonorchis hopkinsi*, holotype, ventral view. **Figure 45.** *Diplomonorchis sphaerovarium*, holotype, ventral view. **Figure 46.** Same, terminal reproductive organs enlarged.

0.120 wide, with unarmed posterior vesicle and anterior region with spines similar to those of cirrus. Ovary smooth, immediately anterior to right testis, 0.075-0.100 long, 0.067-0.090 wide; uterus mostly posttesticular, entering metraterm sac near middle of spinose portion. Genital atrium unarmed; genital pore median, preacetabular. Vitellaria consisting of 2 lateral groups of numerous follicles, mostly posttesticular. Eggs 24-30 by 16-20 μ. Excretory vesicle long, tubular, extending to ventral sucker; pore terminal.

The present species is referred to *Diplomonorchis* even though the ovary is spherical and not lobed as in other members of the genus. That feature, the more extensive vitellaria, and perhaps much longer excretory vesicle distinguish *D. sphaerovarium* from all other species of *Diplomonorchis*. Together these characteristics may be of generic value but until other species having those features are found, we prefer to broaden the concept of the genus *Diplomonorchis* to include those characters. The genus *Diplomonorcheides* Thomas (1959) would then differ from *Diplomonorchis* only in having a bipartite seminal vesicle.

Diplomonorchis emended

Monorchiidae; subfamily Monorchiinae; body oval to elongated. Cuticle spinose. Ventral sucker in anterior half of body; ceca extending to posterior margin of testes or beyond. Testes 2, usually symmetrical, inter- or extracecal. Cirrus sac with unipartite seminal vesicle, pars prostatica and spiny cirrus. Ovary entire or lobed, pretesticular, to right of midline; metraterm sac present, anterior region spinose; uterus extensive. Genital pore midventral, preacetabular. Vitelline follicles postacetabular, lateral, in gonadal zone. Excretory vesicle tubular. Parasites in intestines of marine fishes. Type species: *D. leiostomi* Hopkins, 1941; other species: *D. brevivitellosus* (Manter, 1940) Hopkins, 1941 (Synonym: *Paramonorcheides brevivitellosus*); **D. myrophitis** n.sp.; **D. micropogoni** s.sp.; **D. hopkinsi** n.sp.; **D. sphaerovarium** n.sp.

Order *Opisthorchiida* La Rue, 1957
Suborder *Opisthorchiata* La Rue, 1957
Superfamily *Opisthorchioidea* (Witenberg, 1929) Vogel, 1930

FAMILY CRYPTOGONIMIDAE Ciurea, 1933

Metadena adglobosa Manter, 1947

Hosts: Lutianus apodus (C, J); **L. aya* (C); *L. griseus* (C, J); **L. jocu* (J); **L. synagris* (J).

Site: ceca and intestine.

Metadena crassulata Linton, 1910

Hosts: Lutianus analis (J); **L. aya* (C).

Site: intestine.

Metadena globosa (Linton, 1910) Manter, 1947

Synonym: Stegopa globosa Linton, 1910.

*Hosts: *Lutianus apodus* (J); *L. aya* (C); *Ocyurus chrysurus* (J).

Site: intestine.

Paracryptogonimus neoamericanus Siddiqi & Cable, 1960

Hosts: Lutianus aya (C); *Ocyurus chrysurus* (C).

Site: intestine.

Certain dimensions given by Siddiqi and Cable (1960) are extended by a single specimen found in *L. aya.* It measures 1.293 by 0.772 and has oral spines up to 26 μ long.

Siphodera vinaledwardsii (Linton, 1899) Linton, 1910

Synonym: Monostomum vinaledwardsii Linton, 1899.

Hosts: Lutianus analis (C, J); **L. aya* (C); **L. buccanella* (C); *L. synagris* (J); *Ocyurus chrysurus* (C, J).

Site: intestine.

FAMILY HETEROPHYIDAE Odhner, 1914

Scaphanocephalus sp.

Host: Epinephelus striatus (J).

Site: intestine.

The single specimen was large and well developed but lacked eggs. It probably was a recently ingested metacercaria that had excysted in the intestine of the fish but could not have persisted and matured there. The genus *Scaphanocephalus* is closely related to *Galactosomum* and species of both genera are parasites of piscivorous birds.

Suborder *Acanthocolpiata* n.subo.
Superfamily *Acanthocolpoidea* n.superf.
FAMILY ACANTHOCOLPIDAE Lühe, 1909

After La Rue (1957) placed the family Acanthocolpidae in the superfamily Allocreadioidea of the suborder Plagiorchiata, Peters (1961) described the embryology of the cercarial excretory system and, on that basis, suggested a closer affinity of that family with the Echinostomatoidea. The morphology of their adults is indeed very similar as is also the development of the excretory system in their cercariae, except that the bladder is large and epithelial in the Acanthocolpidae whereas the echinostomes have a small bladder that lacks an epithelium. In that respect and in the location of the primary excretory pores, the embryology of the excretory system in acanthocolpids agrees with that of cercariae of the order Opisthorchiida as characterized by La Rue. However, differences in both larval and adult morphology exceed those occurring between families, superfamilies or even suborders of La Rue's scheme. For that reason, a new suborder is proposed and characterized as follows:

Suborder *Acanthocolpiata*

Spinose, distomatous trematodes with biocellate cercaria developing in rediae in marine prosobranch gastropods. Excretory system stenostomate; primary pores of cercarial embryo in tail, well removed from body-tail furrow; excretory vesicle sac- to Y-shaped with short arms, wall with conspicuous granular cells. Cercaria with well-developed suckers; oral sucker not protrusible, with or without stylet. Tail well-developed, with or without longitudinal fins, possibly zygocercous or otherwise modified in species whose life histories are unknown. Metacercariae in fishes.

The new superfamily has the characters of the suborder but is not further characterized at this time because of the possibility that it will eventually include the Campulidae. No life histories in that family have yet been determined. However, its affinity with the acanthocolpids is strongly suggested by unpublished studies made in this laboratory concerning the adult morpohlogy of *Orthosplanchnus fraterculus*, a campulid from the gall bladder of the sea otter, *Enhydra lutris.*

Stephanostomum casum (Linton, 1910) McFarlane, 1936

Synonyms: Stephanochasmus casus Linton, 1910; *Lechradena edentula* Linton, 1910

Hosts: **Lutianus aya* (C); **L. buccanella* (C), **L. synagris* (J).

Site: intestine.

Stephanostomum coryphaenae Manter, 1947

Host: Coryphaena hippurus (C).

Site: intestine.

Stephanostomum dentatum (Linton, 1900) Manter, 1931

Synonym: Distomum dentatum Linton, 1900.

Hosts: Epinephelus striatus (J); **Mycteroperca bonaci* (C).

Site: intestine.

Stephanostomum sentum (Linton, 1910) Manter, 1947

Synonym: Stephanochasmus sentus Linton, 1910.

Hosts: **Anisotremus virginicus* (J); **Caranx latus* (J); *Gerres cinereus* (C); **Haemulon album* (C); *H. sciurus* (J); **Lutianus* sp. (C).

Site: intestine.

Stephanostomum ditrematis (Yamaguti, 1939) Manter, 1947

Synonyms: Echinostephanus ditrematis Yamaguti, 1939; *Stephanostomum longisomum* Manter, 1940; *Stephanostomum filiforme* Linton, 1940.

Hosts: **Caranx bartholomaei* (J); **C. crysos* (J); *C. hippos* (J); *C. latus* (J); **Caranx* sp. (C).

Site: intestine.

Stephanostomum pseudocarangis Sogandares-Bernal, 1959

Host: Holocentrus ascensionis (J).

Site: intestine.

Stephanostomum megacephalum Manter, 1940

Host: Caranx latus (J).

Site: intestine.

Stephanostomum **aulostomi** n.sp.

Figures 47 and 48

Host: Aulostomus maculatus (C).

Site: junction of stomach and intestine.

Holotype: U.S.N.M. 60289.

Description based on one complete and 2 incomplete specimens. Body elongated, 6.37 long, 0.547-0.667 in maximum width at level of acetabulum. Entire cuticle spinose, spines becoming sparse posteriorly; eye-spot pigment present. Oral sucker 0.193 by 0.273, with 36 perioral spines 21-37 by 11-15 μ, alternating in 2 rows of 18 each; ventral sucker 0.333-0.387 in diameter; sucker ratio 1:1.6. Prepharynx 0.700 long; pharynx 0.300-0.334 long, 0.167-0.180 wide; esophagus short; intestinal bifurcation close to acetabulum; ceca extending to near posterior end of body, joining excretory vesicle to form uroproct; feces seen discharged from terminal pore. Gonads in posterior third of body. Testes 2, 0.360-0.587 long, 0.187-0.234 wide, tandem, separated by vitelline follicles. Cirrus sac long, not quite reaching midway between acetabulum and ovary, containing saccate seminal vesicle, pars prostatica and long spiny cirrus. Ovary 0.300-0.327 long, 0.253-0.267 wide, anterior to, and separated from testes by vitelline follicles; uterine seminal receptacle, Mehlis' gland and uterus preovarian; metraterm well-developed, without spines, joining male duct near posterior margin of acetabulum. Genital atrium tubular; genital pore immediately preacetabular. Eggs 60-75 by 45-51 μ. Vitelline follicles extending from posterior end of body to near posterior margin of ventral sucker. Excretory vesicle obscured by vitellaria.

The combination of 2 uninterrupted rows of 18 oral spines each and vitellaria that extend to near the posterior margin of the ventral sucker distinguishes *S. aulostomi* from most species of *Stephanostomum*. It differs from *S. casum* in having a more elongated body, more anterior testes, less posterior extent of the cirrus sac and gonads separated by vitelline follicles; and from *S. coryphaenae* chiefly in the shape of the cirrus sac, more anterior extent of the vitellaria, and in having a much longer genital atrium and somewhat wider eggs.

In habitat, *S. aulostomi* is unusual, with the oral sucker anchored just above the pyloric sphincter of the host and most of the body in the duodenum. Thus it was not until the digestive tract was opened without separating the stomach and intestine that a complete specimen was obtained.

Stephanostomum metacercaria

Host: Cypselurus bahiensis (C).
Site: cyst on gill arch.

The single acanthocolpid metacercaria found in this study had an oral sucker that was smaller than the acetabulum and 48 perioral spines in 2 uninterrupted rows.

Tormopsolus orientalis Yamaguti, 1934

Host: **Seriola dumerili* (C).
Site: intestine.

Manteria brachydera (Manter, 1940) Caballero, 1950

Synonyms: Dihemistephanus bachyderus Manter, 1940; *Stephanostomum* sp. Linton, 1940.

Host: Oligoplitis saurus (J).
Site: intestine.

Suborder *Hemiurata* Skrjabin & Guschanskaja, 1954
Superfamily *Hemiuroidea* Faust, 1929
FAMILY HEMIURIDAE Lühe, 1901

Parahemiurus merus (Linton, 1910) Woolcock, 1935

Synonyms: Hemiurus merus Linton, 1910; *Parahemiurus parahemiurus* Vaz & Pereira, 1930; *P. platichthyi* Lloyd, 1938; *P. atherinae Yamaguti,* 1938; P. *harengulae* Yamaguti, 1938.

Hosts: Abudefduf saxatilis (J); **Caranx crysos* (J); **C. hippos* (J); **C. latus* (J); **Echeneis naucrates* (C); *Opisthonema oglinum* (J); **Sardinella anchovia* (C, J); *S. macrophthalmus* (J); **Seriola dumerili* (J).
Site: stomach.

Sterrhurus fusiformis (Lühe, 1901) Looss, 1907

Synonym: Lecithochirium fusiformis Lühe, 1901.

Hosts: Gymnothorax moringa (C, J); **G. vicinus* (C).
Site: stomach.

Sterrhurus musculus Looss, 1907

Synonyms: Sterrhurus floridensis Manter, 1934, in part; *Sterrhurus laeve* (Linton) of Manter, 1931.

Hosts: **Achirus lineatus* (J); **Epinephelus adscensionis* (C); **E. morio* (C); **Haemulon album* (C); **H. sciurus* (J); *Holocentrus ascensionis* (C, J); **H. vexillarius* (J); **Leptocephalus conger* (J); **Lutianus apodus* (C); **L. aya* (C); **L. griseus* (C); *Malacanthus plumieri* (J); **Platophrys lunatus* (C, J); **Prionotus punctatus* (J); **Rypticus saponaceus* (C); *Scorpaena plumieri* (C, J); **Selar crume-*

nophthalmus (J); *Synodus intermedius* (C, J); **Trachinotus glaucus* (J).
Site: stomach.

Lecithochirium microstomum Chandler, 1935

Synonym: *Lecithochirium sinaloense* Bravo-Hollis, 1956.
Hosts: *Synodus intermedius* (J); **Selar crumenophthalmus* (J); **Seriola dumerili* (J).
Site: stomach.

Lecithochirium parvum Manter, 1947

Synonym: *Sterrhurus floridensis* Manter, 1934, in part.
Hosts: **Abudefduf saxatilis* (J); **Bathystoma striatum* (J); **Caranx bartholomaei* (J); **C. latus* (J); **C. hippos* (C, J); **Dules dispilurus* (J); **Epinephelus adscensionis* (J); **Holocentrus ascensionis* (J); **Lutianus apodus* (C); **L. aya* (C); **L. griseus* (J); **Sardinella macrophthalmus* (J); **Scorpaena plumieri* (J); **Selar crumenophthalmus* (J); **Seriola dumerili* (C, J); **Upeneus martinicus* (J); *Synodus intermedius* (J).
Site: stomach.

Ectenurus americanus (Manter, 1947) Manter & Pritchard, 1960

Synonyms: *Parectenurus americanus* Manter, 1947; *Magnacetabulum americanum* (Manter) Yamaguti, 1954.
Hosts: *Caranx bartholomaei* (J); **C. crysos* (J); **C. hippos* (J); **Epinephelus striatus* (J); **Selar crumenophthalmus* (J); **Seriola dumerili* (J); **Synodus intermedius* (J).
Site: stomach.

Ectenurus virgulus Linton, 1910

Hosts: **Caranx bartholomaei* (J); **C. hippos* (J); **Priacanthus cruentatus* (C); *Sardinella macrophthalmus* (J); *Selar crumenophthalmus* (J); **Trachinotus glaucus* (J).
Site: intestine.

Dinurus barbatus (Cohn, 1902) Looss, 1907

Synonym: *Lecithocladium barbatum* Cohn, 1902.
Host: *Coryphaena hippurus* (C).
Site: stomach.

Dinurus breviductus Looss, 1907

Host: *Coryphaena hippurus* (C).
Site: stomach.

Dinurus tornatus (Rudolphi, 1819) Looss, 1907

Synonyms: *Distomum tornatum* Rudolphi, 1819; *Lecithocladium tornatum* (Rud.) Lühe, 1901.
Host: *Coryphaena hippurus* (C).
Site: stomach.

Stomachicola rubea (Linton, 1910) Manter, 1947

Synonyms: *Dinurus rubeus* Linton, 1910; *Pseudostomachicola rubea* (Linton) Skrjabin & Guschanskaja, 1954.
Hosts: *Gymnothorax moringa* (J); **G. vicinus* (J).
Site: stomach.

Neogenolinea opisthonemae Siddiqi & Cable, 1960

Hosts: *Opisthonema oglinum* (J); **Sardinella anchovia* (J); **S. macrophthalmus* (J).
Site: stomach.

Brachadena pyriformis Linton, 1910

Synonyms: "*Distomum bothryophoron* Olsson" of Linton, 1905; *Lecithaster anisotremi* MacCallum, 1921; *L. gibbosus* (Rud.) of Linton, 1940 in part; ***Aponurus symmetrorchis* Siddiqi & Cable, 1960.
Hosts: *Anisotremus virginicus* (J); **Archosargus unimaculatus* (J); *Bathystoma striatum* (J); *Calamus bajanado* (J); **Eucinostomus pseudogula* (J); **Haemulon bonariense* (J); **H. flavolineatum* (C, J); *H. sciurus* (J).
Site: stomach.

A reexamination of the type and paratypes of *Aponurus symmeterorchis* Siddiqi and Cable, 1960, reveals that the vitellaria unite centrally, a characteristic of the genus *Brachadena,* and the measurements given overlap those of *Brachadena pyriformis.*

Genolinea **noblei** n.sp.

Figure 49

Host: *Abudefduf saxatilis* (C).
Site: stomach.
Holotype: U.S.N.M. 60290.

Description based on a single specimen. Body thick, rounded at both ends, 1.25 long, 0.367 wide. Oral sucker subterminal, 0.087 long, 0.082 wide, surmounted by conspicuous fleshy lobe; ventral sucker 0.227 long, 0.213 wide, with longitudinal aperture; sucker ratio 1:2.59. Prepharynx absent; pharynx 0.045 long, 0.063 wide; esophagus absent; ceca wide, extending to near posterior end of body. Testes 2, entire, slightly diagonal, 0.075 long, 0.083-0.090 wide, separated by uterine coils; seminal vesicle long, sinuous, not reaching midlevel of acetabulum, with 4 conspicuous swellings connected by narrow ducts; prostate vesicle ovoid, 0.045 long, 0.030 wide, surrounded by prostate cells; duct very short. Ovary entire, 0.060 long, 0.105 wide, posterior to, and separated from testes by uterine coils; Mehlis' gland dorsal to vitellaria; seminal receptacle not evident, possibly concealed by uterus and ceca; uterus extending to near posterior end of body; metraterm well-developed, spiny, joining prostatic duct at base of sinus sac. Hermaphroditic duct with swollen posterior region and elongated anterior portion. Sinus sac apparently of open or incomplete type. Genital pore ventral, opposite intestinal bifurcation. Eggs 28-33 by 10-12 μ. Vitellaria 2 compact, tandem masses immediately postovarian. Excretory vesicle short, lined with epithelial cells; excretory ducts uniting dorsal to pharynx.

The spiny metraterm and longitudinal aperture of the acetabulum distinguish this species from all others in the genus *Genolinea*. *G. tanyopa* Montgomery, 1957, has a longitudinal aperture but differs from *G. noblei* in sucker ratio, posterior extent of the seminal vesicle, nature of the sinus sac and also in having a much longer prostatic duct.

The species is named in honor of the late Alden E. Noble of the University of the Pacific in recognition of his contributions to trematodology.

Aponurus elongatus Siddiqi & Cable, 1960
Synonym: Aponurus sp. Linton, 1940.
Host: Chaetodipterus faber (J).
Site: stomach.

Leurodera decora Linton, 1910
Hosts: Anisotremus virginicus (J); *Haemulon flavolineatum* (J); *H. sciurus* (J).
Site: stomach.

Dichadena acuta Linton, 1910
Synonym: Lecithaster acutus (Linton) Manter, 1947.
Hosts: Acanthurus bahianus (C); *A. coeruleus* (J); *A. hepatus* (C, J).
Site: stomach.

Macradena perfecta Linton, 1910
*Host: *Acanthurus hepatus* (C, J).
Site: stomach.

Hysterolecitha rosea Linton, 1910
Host: Acanthurus hepatus (J).
Site: stomach.

Hysterolecitha **sogandaresi** n.sp.

Figure 50

Host: Acanthurus coeruleus (J).
Site: stomach.
Holotype: U.S.N.M. 60291.

Description based on 3 specimens. Body non-appendiculate, tapering posteriorly, 1.54-2.22 long, 0.467-0.533 in maximum width at level of acetabulum. Oral sucker subterminal, 0.147-0.173 long, 0.167-0.220 wide; ventral sucker near midbody, 0.367-0.433 long, 0.387-0.400 wide; sucker ratio 1:2.14-2.33. Prepharynx absent; pharynx 0.060-0.070 long, 0.070-0.090 wide; esophagus very short; ceca swollen near intestinal bifurcation, extending to near posterior end of body. Testes 2, entire, diagonal (nearly tandem in one specimen), 0.082-0.123 in diameter; anterior testis somewhat dorsal to acetabulum; seminal vesicle long, coiled tube, mostly anterior to ventral sucker; pars prostatica short, surrounded by prostate cells. Ovary entire, submedian, posttesticular, 0.068-0.105 in diameter, usually overlapping posterior level of testes; uterus extending to near tips of ceca; metraterm simple, joining short prostatic duct at base of small, spherical sinus sac. Hermaphroditic duct short. Genital pore median, ventral, some distance posterior to intestinal bifurcation. Eggs numerous, 26-31 by 15-19 μ. Vitellaria of 7 subglobular follicles, immediately postovarian. Excretory arms uniting dorsal to pharynx; excretory pore terminal.

Of the 11 species described in *Hysterolecitha*, *H. sogandaresi* is most similar to *H. acanthuri* Annereaux, 1947, from a related host in the Phillippines but differs from that species in having testes closer to the acetabulum, a shorter prostatic duct and more compact vitellaria.

This species is named in honor of Dr. Franklin Sogandares in recognition of his contributions to knowledge of the Trematoda.

Theletrum **pomacentri** n.sp.

Figure 51

Host: Pomacentrus leucosticus (J).
Site: stomach.
Holotype: U.S.N.M. 60292.

Description based on a single specimen. Body non-appendiculate, tapering posteriorly, 1.54 long, 0.500 in maximum width at level of acetabulum; forebody 0.413 long, hindbody 0.865. Oral sucker 0.099 long, 0.105 wide; ventral sucker 0.262 long, 0.240 wide, with longitudinal aperture; sucker ratio 1:2.43. Prepharynx absent; pharynx spherical, 0.054 in diameter; esophagus short; ceca extending to near posterior end of body. Testes smooth, diagonal, 0.075-0.090 in diameter; seminal vesicle coiled, tubular, mostly preacetabular; prostate vesicle reniform, surrounded by poorly-developed prostate cells. Ovary bilobed, 0.060 long, 0.135 wide, posterior to, and separated from testes by coils of uterus; Mehlis' gland not evident; uterus voluminous, not reaching ends of ceca; metraterm simple, ventral to seminal vesicle, joining very short prostatic duct at base of sinus sac. Hermaphroditic duct widest anteriorly; sinus sac subglobular, 0.060 by 0.075. Genital pore midventral, posterior to intestinal bifurcation. Eggs numerous, 27-30 by 10-12 μ. Vitellaria immediately postovarian; in 3 compact masses with 2 anterior ones possibly connected by an isthmus; posterior mass slightly indented. Excretory system not observed.

Theletrum pomacentri differs from all the other species in the genus in having a bilobed ovary. It further differs from *T. fustiforme* Linton, 1910, in lacking the postacetabular fold and in having 3 rather than 2 vitelline masses; from *T. gravidum* Manter, 1940, in sucker ratio and shape and extent of seminal vesicle; from *T. lissosomum* Manter, 1940, in sucker ratio; and from *T. magnasaccum* Sogandares-Bernal and Sogandares, 1961, in shape and extent of the seminal vesicle, shape of the sinus sac and in the position of the genital pore.

The type specimen was damaged after it was studied and drawn.

In Jamaica and especially Curaçao, surgeon fish were commonly infected with a monorchid hemiurid which otherwise resembled species of *Macradena*. To receive that species, a new genus is proposed and characterized as follows:

Monorchimacradena n.g.

Hemiuridae. Medium size distomes without ecsoma. Cuticle smooth. Oral sucker subterminal; ventral sucker preequatorial. Ceca extending to near posterior end of body. Testis single; seminal vesicle postacetabular; pars prostatica long, tubular, mostly posterior to ventral sucker, surrounded by prostate cells. Sinus sac present. Ovary entire, posttesticular; seminal receptacle present. Vitellaria of elongated lobes, postovarian. Eggs small and numerous. Excretory commissure present. Parasitic in intestine of marine fish. Type and only species:

Monorchimacradena acanthuri

n.g., n.sp.

Figure 52

Host: Acanthurus hepatus (C, J).
Site: intestine.
Holotype: U.S.N.M. 60293.

Description based on 38 specimens; measurements on 10. Body usually elongated, 1.1-2.57 long, 0.240-0.374 in maximum width at level of acetabulum. Oral sucker subterminal, 0.082-0.145 long, 0.105-0.180 wide; preoral lobe fleshy, often expanded, resembling head of a planarian, especially noticeable in living specimens. Ventral sucker in anterior third or fourth of body, 0.150-0.266 in diameter, aperture transverse; sucker ratio 1:1.3-1.8. Prepharynx absent; pharynx 0.060-0.097 in diameter; esophagus about same length as pharynx; ceca without epithelium for a short distance from intestinal bifurcation, ending blindly near posterior end of body. Testis about equatorial, 0.105-0.200 long, 0.068-0.130 wide; seminal vesicle sac-like, immediately pretesticular; pars prostatica long, tubular, usually in hindbody, sometimes partly dorsal to ventral sucker, surrounded by conspicuous prostate cells along entire length; ejaculatory duct as long as pars prostatica when not contracted. Ovary smooth, 0.045-0.160 in diameter, immediately posttesticular; seminal receptacle as large or larger than ovary; uterus extending to near posterior extremity; metraterm simple, joining pars prostatica at base of sinus sac. Hermaphroditic duct wide. Sinus sac spherical to pyriform, 0.060-0.112 in diameter. Genital pore midventral, posterior to intestinal bifurcation. Eggs numerous, 20-28 by 9-15 μ. Vitellaria immediately postovarian, of 7 digitiform or

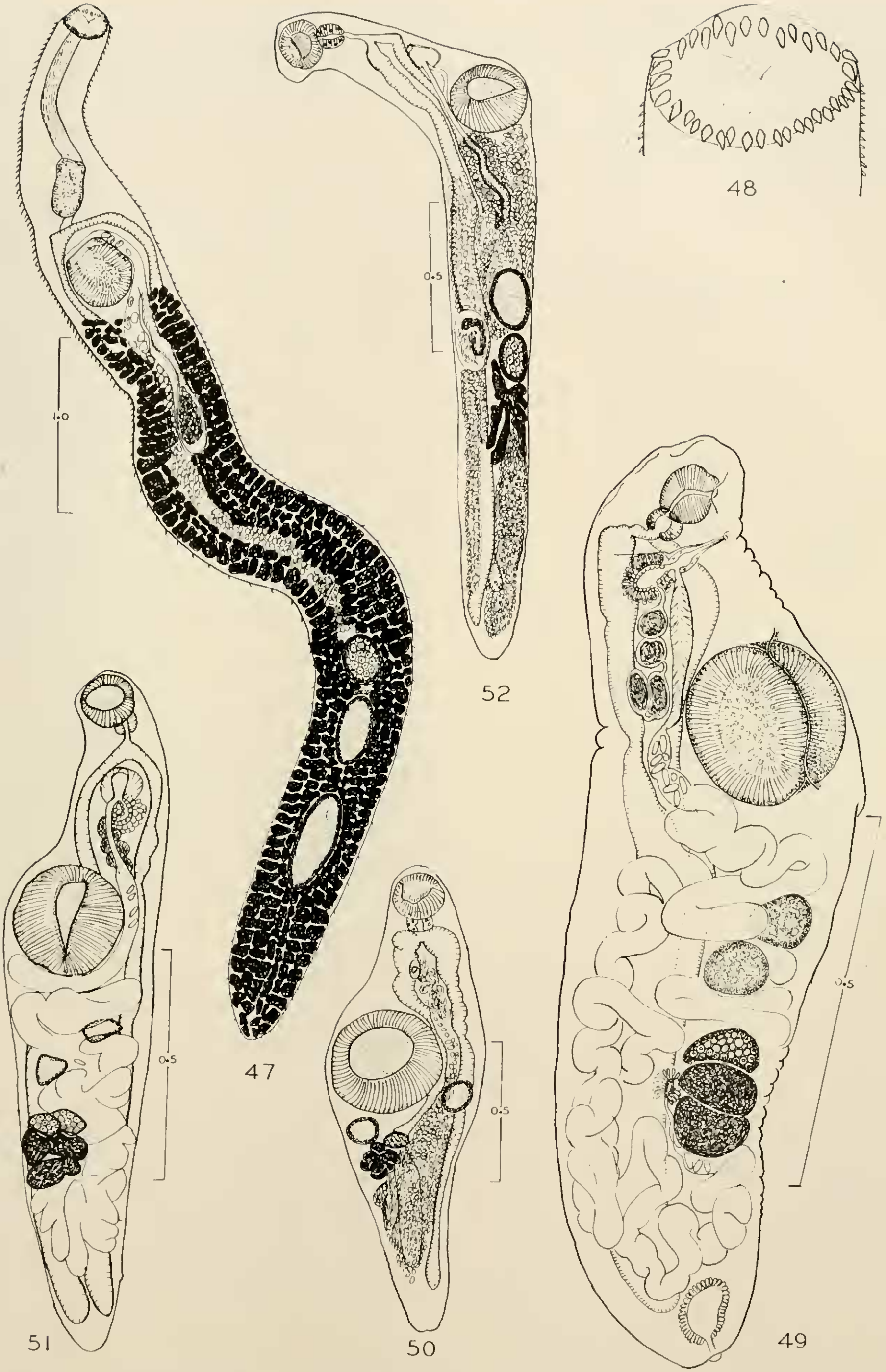


Figure 47. *Stephanostomum aulostomi*, holotype, dorsal view. **Figure 48.** Same, anterior end enlarged. **Figure 49.** *Genolinea noblei*, holotype, ventrolateral view. **Figure 50.** *Hysterolecitha sogandaresi*, holotype, ventral view. **Figure 51.** *Theletrum pomacentri*, holotype, ventral view. **Figure 52.** *Monorchimacradena acanthuri*, holotype, ventral view.

slightly branched lobes, united centrally. Excretory system with commissure dorsal to pharynx; pore terminal.

Dictysarca virens Linton, 1910
Hosts: Gymnothorax funebris (J); *G. moringa* (J); **G. vicinus* (J).
Site: swim bladder.

FAMILY ACCACOELIIDAE Looss, 1912

Tetrochetus coryphaenae Yamaguti, 1934
Hosts: Coryphaena hippurus (C); **Diodon hystrix* (J).
Site: intestine.

FAMILY HIRUDINELLIDAE Dollfus, 1932

Hirudinella sp.
Host: Scorpaena plumieri (C).
Site: stomach.

A single immature specimen was taken from the stomach of a scorpion fish.

FAMILY SCLERODISTOMIDAE Dollfus, 1932

Sclerodistomum sphoeroidis Manter, 1947
Host: **Diodon hystrix* (C, J).
Site: stomach.

FAMILY PROSOGONOTREMATIDAE Pérez Vigueras, 1940

Prosogonotrema bilabiatum Pérez Vigueras, 1940
Host: Ocyurus chrysurus (J).
Site: stomach.

V. Geographical Distribution

The geographical distribution of the digenetic trematodes of marine fishes in the Gulf-Caribbean region has been discussed by a number of investigators. Manter (1940b, 1947, 1955) included them in reviewing the zoogeography of the group on a world-wide basis. A more limited approach was that of Sparks (1960) who concluded that the "hydrographic, climatological, physiographic and geological conditions existing both now and in the past in the northern gulf" are responsible for the differences seen between the trematode faunas of the Dry Tortugas and Grand Isle, Louisiana. Siddiqi and Cable (1960) discussed geographical distribution and the related factors of isolation, speciation and host specificity. They compared the trematode fauna of Puerto Rico with that of Tortugas, Bermuda, Galapagos Islands, Woods Hole, Beaufort and Hawaii and found that the per cent of Puerto Rican species common also to each of those localities decreased in the order listed, from a maximum of 76% at Tortugas.

The present study provides data from 2 additional localities in the Caribbean region. Table 1 compares by families the number of new and previously described species from those localities. With respect to the total found there, the differences in their trematode faunas are striking in certain families. Curaçao is notably poor in fellodistomatid species where but 3, all previously known and widely distributed, were found in 4 of 124 species of fishes. In contrast, 12 species of fellodistomatids were found in Jamaica where 127 species of fishes were examined. The difference may be due to the limited variety of habitats in Curaçao for lamellibranch molluscs which serve as intermediate hosts of the fellodistomatids. On the other hand the richness of such habitats in Jamaica and the life history pattern in that family would seem to favor speciation in the group as indicated by the discovery there of 4 new species. In known life histories, fellodistomatid metacercariae occur in molluscs or possibly amphipods and would be ingested only by birds feeding in shallow water or by bottom-feeding fishes where the food source could serve to isolate populations of shallow water host species.

The same may be observed concerning the family Lepocreadiidae except that in it, gastropods serve as the mulluscan hosts. Their relative abundance and variety in Curaçao, as compared with lamellibranchs, is reflected in the discovery there of 5 new lepocreadiids, whereas 6 were found in Jamaica. A comparable situation with respect to new species of monorchiids, which have lamellibranch molluscan hosts, seems to contradict what was said above concerning the fellodistomatids but may be explained by a lower degree of specificity of the monorchiids for those hosts. For example, *Cercaria caribbea XXXVI*, a monorchid larva, occurs in at least 2 distantly related species of bivalves in different localities.

Curaçao is rather removed from other Gulf-Caribbean areas that have been investigated. The number of known trema-

TABLE 1.

Distribution of Digenetic Trematode Species.

	Number of Species						
		Curaçao		Jamaica		common to both localities	
Family	total	old	new	old	new	old	new
Aspidogastridae	2	0	0	2	0	0	
Acanthocolpidae	10	6	1	7	0	4	
Accacoeliidae	1	1	0	1	0	1	
Bivesiculidae	1	0	1	0	1	0	1
Bucephalidae	15	12	1	10	0	8	
Cryptogonimidae	5	5	0	4	0	4	
Fellodistomatidae	12	3	0	8	4	3	
Gorgoderidae	2	1	0	1	1	1	
Hemiuridae	23	11	2	16	3	8	1
Haploporidae	4	1	0	4	0	1	
Haplosplanchnidae	11	6	3	5	3	5	1
Lepocreadiidae	36	11	5	22	6	6	2
Megaperidae	3	2	0	1	1	1	
Microphallidae	2	2	0	0	0	0	
Monorchiidae	17	6	4	8	5	6	
Opecoelidae	21	8	3	16	0	6	
Opistholebetidae	2	1	0	2	0	1	
Paramphistomatidae	1	0	0	1	0	0	
Pronocephalidae	1	0	0	1	0	0	
Prosogonotrematidae	1	0	0	1	0	0	
Sclerodistomatidae	1	1	0	1	0	1	
Zoogonidae	7	4	0	4	1	2	
	178	80	20	115	25	57	5

Not included in this table are *Stephanostomum* metacercaria, *Hirudinella* sp. (immature), *Scaphanocephalus* sp., and *Alcicornis siddiqii.*

tode species found there, however, reflects its nearness to the mainland, along the coast of which many such species probably have a continuous distribution toward both Central America and eastward along the South American coast. Other species are cosmopolitan parasites of far-ranging fishes throughout the region. However, a degree of isolation is suggested by the number of new species in certain families including those discussed above, and by the absence of certain others. Thus 3 of 11 opecoelids found in Curaçao are new whereas all of 16 Jamaican species are known ones. On the other hand, the opecoelids, *Hamacreadium mutabile* and *Helicometrina nimia,* were not found in Curaçao although numbers of their host species were examined. The same was observed for several other species indicated by a dagger in the Host-Parasite List.

Table 2 includes, by family, the number of species common to each of several localities and Tortugas where 146 species are known excluding those reported from deep-water fishes. Cuba is not included in the table because Pérez Vigueras described as new several species which were not adequately compared with known ones and probably are not distinct from them. Most similar to the trematode fauna of Tortugas is that of the Bahamas (Bimini, Nassau and Eleuthera) and Bermuda, as is to be expected from their relationship to the Gulf Stream. When Jamaica and Curaçao are compared with Tortugas, the percent of their trematode species in common with that locality is the same even though Curaçao is much farther from Tortugas. The somewhat lower percentage for Puerto Rico reflects its isolated position at the eastern end of the Greater Antilles chain. Differences in the trematode faunas of the northern Gulf of Mexico and Tortugas have been discussed by Sparks (1960) and are indicated by the percentages given in Table 2. The physiographic factors which he stressed probably determine the distributional limits not only of definitive host species but perhaps more significantly those of molluscan hosts as well. Several molluscs that harbor a variety of larval trematodes throughout

TABLE 2.

Resemblance of the trematodes of marine fishes from the Gulf-Caribbean areas to those of Tortugas, Florida, as indicated by the number of species common to both localities.

Family	Dry Tortugas (146)*	Nassau, Eleuthera (22)*	Bimini (60)*	Jamaica (140)*	Puerto Rico (123)*	Curaçao (100)*	Bermuda (43)*	Grand Isle, La. (44)*	Boca Ciega & Tampa Bays (30)*
Aspidogastridae	1		1	1			1	1	
Acanthocolpidae	7	2	4	5	4	5	2	2	2
Accacoeliidae	1		1	1		1		1	
Bivesiculidae	1		1		1				
Bucephalidae	13	1	3	5	3	7	1		1
Cryptogonimidae	4	1	3	4	2	4	2	1	1
Fellodistomatidae	9	1	4	7	4	3	1		1
Gorgoderidae	2			1	1	1	1		
Hemiuridae	32	3	9	14	14	11	4	14	4
Hirudinellidae	1	1			1				
Haploporidae	4	2		2		1	1	1	
Haplosplanchnidae	7		1	4	3	4	2		
Lepocreadiidae	16		7	11	7	3	5	1	1
Megaperidae	4		2	1	3	2	1		
Microphallidae									
Monorchiidae	9	1	2	7	4	5	2		
Opecoelidae	21	7	7	10	9	6	1		
Opistholebetidae	2			1	1		1		
Paramphistomatidae	1		1		1				
Pronocephalidae	2		1	1	2		1		
Sclerodistomatidae	1			1		1			1
Zoogonidae	8		1	3		3	2		1
Total	146	19	48	79	60	57	28	21	12
Percent of species in common	100	89	80	57	50	57	65	48	40

*Number in parenthesis following locality indicates total number of trematode species known from that area.

the Caribbean region disappear before reaching the latitude of Boca Ciega Bay or Grand Isle in the Gulf of Mexico. Hence adults of trematodes that are specific for such molluscs would not be found in non-migratory hosts north of that latitude. A notable exception to that situation allows the cryptogonimid, *Siphodera vinaledwardsii*, to occur from Cape Cod to Curaçao at least. That species has as its molluscan host snails that are very similar if not the same species throughout that range. However, north of Tortugas, whether along the Atlantic or Gulf coasts, the definitive host is a toadfish which is replaced by very different fishes, the snappers, from Tortugas southward.

VI. HOST SPECIFICITY

Because the host is the immediate environment of the parasite, host specificity as well as distribution is an isolating factor of major importance in the zoogeography of parasites in general. Manter (1957) summarized the extent to which digenetic trematodes have been reported from one or more species of marine fishes in Japan, Tortugas, the Mediterranean, and the British Isles. According to him, the trematodes found in but one host species ranged from 48% of the known species in the British Isles to 76.4% in Japan; the average for all localities, calculated from Manter's data, is 60.9% and that for Curaçao and Jamaica combined

TABLE 3.

Host specificity of trematodes from Curaçao and Jamaica for species, genera, and families of marine fishes.

Family of Trematodes	Number of Species	Number of Host																	
		Species						Genera						Families					
		1	2	3	4	5	5+	1	2	3	4	5	5+	1	2	3	4	5	5+
Aspidogastridae	2	2						2						2					
Acanthocolpidae	10	6	1	1		1	1	8	1			1		9			1		
Accacoeliidae	1		1						1						1				
Bivesiculidae	1	1						1						1					
Bucephalidae	15	11	2	1			1	14		1				15					
Cryptogonimidae	5		2	1		2		2	3					5					
Fellodistomatidae	12	8	3				1	11			1			11	1				
Gorgoderidae	2	1				1		1				1		1				1	
Hemiuridae	23	10	2	5			6	14	2	1		2	4	16	1	3	1		2
Haploporidae	4	1	2	1				2	2					3	1				
Haplosplanchnidae	11	5	1	1	3		1	7	2	1	1			10			1		
Lepocreadiidae	36	25	7	2	1	1		34	1	1				34	2				
Megaperidae	3	2		1				3						3					
Microphallidae	2	1	1					2						2					
Monorchiidae	17	10	3		2		2	11	5			1		14	2	1			
Opecoelidae	21	12	5	2			2	19				1	1	19	1				1
Opistholebetidae	2	1		1				1	1					2					
Paramphistomatidae	1	1						1						1					
Pronocephalidae	1		1					1						1					
Prosogonotrematidae	1	1						1						1					
Sclerodistomatidae	1	1						1						1					
Zoogonidae	7	5	1	1				5	1	1				5	2				
Totals	178	104	32	17	6	5	14	141	19	5	2	6	5	156	11	4	3	1	3

is 59%. Trematodes recovered from 2 host species varied between 12.1% in Japan to 22.6% in Tortugas with an average of 17.7% compared with 18% in the present study. For 3 host species, the number ranged from 6.76% in Japan to 9.3% in the British Isles, and averaged 7.74% as compared with 9.5% in Curaçao and Jamaica. For 4 hosts, the range was from 1.68% in Japan to 6.6% in the British Isles, averaging 3.7% which is very close to 3.4% calculated from the present study. From 3% of the trematode species in Japan to 18.6% in the British Isles have been reported from 5 or more host species, with an average of 9.77%; present data show 10.6% in Curaçao and Jamaica.

The above data indicate a rather high degree of host specificity for trematodes of marine fishes but do not take into account the differences between trematode families or the degree to which more than one host species of a trematode may be related. Those aspects are included in Table 3 from which the above calculations for Curaçao and Jamaica were made. In it, each trematode family is analyzed according to the number of its species found in various host species, genera and families. Although certain trematode families are represented by only one or a few species, the table shows in general that when host species are grouped into higher taxa, viz., genera and families, the number of trematode species reported from hosts belonging to more than one such taxon progressively decreases. On that basis, hemiurid species are least host specific whereas the lepocreadiids show the opposite extreme. The striking difference between those groups probably is correlated with the localization of the majority of hemiurids in the stomachs of their hosts whereas all of the lepocreadiids reported in this study are intestinal parasites. Another factor is how much the parasite must grow and develop to mature after reaching the host; in this case it is less in the hemiurids than the lepocreadiids. A group with even more advanced metacercariae than the hemiurids is the microphallids, of which one species, previously known only from birds, is here reported from snake-eels. Until trematode life histories and the food habits of potential hosts are better known, it will be impossible to distinguish trematodes that are truly host-specific from those that do not have the opportunity to infect more than a few of the potential available hosts. Enough is known, however, to indicate rather clearly that larval trematodes are usually more specific in their molluscan hosts than are adults with respect to vertebrates.

VII. Alphabetical Host-Parasite List

Following each host species is the number of individuals examined from Curaçao (C) and or Jamaica (J). For each parasite species, the number of infected fish is given for one or both localities. A dagger (†) indicates a trematode species found in one locality but not the other where the number of potential hosts examined indicates rarity if not absence of the parasite.

	C	J
Abudefduf saxatilis (Linnaeus), sergeant major	12	22
†*Genolinea noblei*	1	
Lecithochirium parvum		1
Parahemiurus merus		2
Schikhobalotrema adacuta		1
†*Schikhobalotrema bivesiculum*		1
Acanthurus bahianus Castelnau, ocean tang	2	
Dichadena acuta	1	
Schikhobalotrema obtusa	1	
Acanthurus coeruleus Bloch & Schneider, blue tang		5
Dichadena acuta		4
Hapladena varia		5
Hysterolecitha sogandaresi		1
Mesolecitha linearis		1
Acanthurus hepatus (Linnaeus), doctor fish	24	22
Dichadena acuta	13	17
Hapladena varia	4	9
Hysterolecitha rosea		2
Macradena perfecta	1	4
Monorchimacradena acanthuri	8	8
Schikhobalotrema obtusa	2	
Achirus lineatus (Linnaeus), striped sole		6
Sterrhurus musculus		1
Angelichthys ciliaris (Linnaeus), queen angelfish		12
Glyphicephalus candidulus		1
Anisotremus virginicus (Linnaeus), porkfish		12
Brachadena pyriformis		1
Diphtherostomum anisotremi		3
Diplangus paxillus		1
Hamacreadium oscitans		5
Infundibulostomum anisotremi		1
Lasiotocus longicaecum		10
Leurodera decorum		1
Proctotrema anisotremi		5
Stephanostomum sentum		1
Archosargus unimaculatus (Bloch), brim		9
Brachadena pyriformis		1
Diplomonorchis micropogoni		1
Hamacreadium oscitans		1
Megasolena archosargi		5
Multitestis rotundus		4
Pachycreadium crassigulum		2
Aulostomus maculatus Valenciennes, trumpet fish	9	2
Stephanostomum aulostomi	3	
Balistes ringens Linnaeus, cocuyo	1	
Pseudocreadium galapagoensis		
Balistes vetula Linnaeus, queen triggerfish	2	2
Apocreadium balistis		1
Neoapocreadium coili		1
Pseudocreadium lamelliforme		2
Xystretrum solidum		1
Bathystoma aurolineatum (Cuv. & Val.), yellow tomtate		2
Hamacreadium ositans		1
Lasiotocus longovatus		1
Lasiotocus truncatus		1
Bathystoma striatum (Linnaeus), common tomtate		16
Brachadena pyriformis		1
Genolopa ampullacea		6
Lecithochirium parvum		1

	C	J
Bodianus rufa (Linnaeus), Spanish hogfish		1
Lepocreadium bimarinum		
Brachygenys chrysargyreus (Günther), Bronze grunt	1	
Homalometron foliatum		
Lasiotocus truncatus		
Calamus arctifrons Goode & Bean, grass porgy		4
Lepocreadium opsanusi		1
Pachycreadium crassigulum		1
Proctoeces lintoni		1
Pseudocreadium anandrum		1
Calamus bajonado (Bloch & Schneider), jolt-head porgy		5
Brachadena pyriformis		1
Cotylogaster basiri		2
Lepocreadium opsanusi		4
Pachycreadium crassigulum		1
Proctoeces lintoni		2
Pseudocreadium anandrum		1
Calamus calamus (Cuv. & Val.), saucer-eye porgy		4
Hamacreadium oscitans		1
Lasiotocus truncatus		3
Cantherines pullus (Ranzani), gray filefish	8	14
Apocreadium (immature)		2
Diploproctodaeum haustrum	2	4
Megapera pseudogyrina		9
Xystretrum solidum		1
Canthigaster rostratus (Bloch), sharp-nosed puffer	4	
Xystretrum-solidum	1	
Caranx bartholomaei (Cuv. & Val.), yellow jack		8
Alcicornis carangis		3
Bucephalus varicus		2
Ectenurus americanus		2
Ectenurus virgulus		1
Genolopa brevicaecum		2
Lecithochirium parvum		2
Stephanostomum ditrematis		3
Tergestia acuta		1
Tergestia pectinata		5
Caranx chrysos (Mitchill), hard-tailed jack	1	1
Bucephalus varicus	1	
Ectenurus americanus		1
Parahemiurus merus		1
Pseudopecoeloides carangi	1	
Stephanostomum ditrematis		1
Tergestia acuta		1
Caranx hippos (Linnaeus), common jack	1	3
Bucephalus varicus	1	3
Ectenurus americanus		2
Ectenurus virgulus		2
Lecithochirium parvum	1	2
Parahemiurus merus		2
Stephanostomum ditrematis		2
Tergestia pectinata		3
Caranx latus Agassiz, horse-eye jack	4	18
Bucephalus varicus	4	16
Lecithochirium parvum		2
Parahemiurus merus		4
Stephanostomum ditrematis		4
Stephanostomum megacephalum		4
Stephanostomum sentum		1
Tergestia pectinata	2	9
Caranx ruber (Bloch), skip-jack	1	2
Alcicornis carangis	1	
Bucephalus varicus	1	1
Pseudopecoeloides carangi	1	1
Caranx-sp., jack	1	
Bucephalus varicus		
Stephanostomum ditrematis		
Centropomus undecimalis (Bloch), snook		3
Bucephalus sp.		1
Ceratacanthus schoepfi (Walbaum), orange filefish		5
Rhagorchis odhneri		5
Chaetodipterus faber (Broussonet), spadefish		6
Allomegasolena spinosa		1
Aponurus elongatus		4
Gymnotergestia chaetodipteri		2
Multitestis blenni		4
Multitestis inconstans		5
Chaetodon capistratus Linnaeus, four-eyed butterfly fish	15	9
Hurleytrematoides chaetodoni	2	5
†*Hurleytrematoides curacaensis*	3	
†*Multitestis chaetodoni*		5
Multitestis rotundus	10	2
Chaetodon ocellatus Bloch, common butterfly fish	6	6
Hurleytrematoides chaetodoni	1	2
Hurleytrematoides curacaensis	2	
Chaetodon striatus Linnaeus, banded butterfly fish	4	7
Hurleytrematoides chaetodoni		1
Multitestis chaetodoni		4
Chloroscombrus chrysurus (Linnaeus), bumper		2
Bucephalus varicus		2
Opechona chloroscombri		2
Tergestia pectinata		2
Clepticus parrae (Bloch & Schneider) creole	1	2
Tergestia laticollis	1	1
Coryphaena hippurus Linnaeus, dolphin	3	
Dinurus barbatus	2	
Dinurus breviductus	2	
Dinurus tornatus	2	
Hirudinella-sp.	1	
Stephanostomum coryphaenae	1	
Tetrochetus coryphaenae	1	
Decapterus macarellus (Cuv. & Val.), mackerel scad	5	
Chrisomon decapteri	4	
Diodon hystrix Linnaeus, porcupine fish	6	11
†*Diploproctodaeum diodontis*		6
Opistholebes diodontis	1	2
Sclerodistomum diodontis	1	3
Tetrochetus coryphaenae		1
Doratonotus megalepis Günther, mottled sea basslet		5
Pseudopecoelus minutus		3
Dules dispilurus Günther, sandfish		14
Lecithochirium parvum		2
Echeneis naucrates Linnaeus, shark remora		2
Parahemiurus merus		1
Echidna catentata Bloch, chained moray		11
Diplohurleytrema brevicaecum		3
Epinephelus adscensionis (Osbeck), rock hind	14	11
Lecithochirium parvum		3
Opecoeloides vitellosus		1
Postporus epinepheli	7	2
Sterrhurus musculus	1	
Epinephelus guttatus (Linnaeus), red hind	6	
Postporus epinepheli	1	
Epinephelus morio (Cuv. & Val.), red grouper	1	
Sterrhurus musculus		
Lepidapedon trachinoti		
Postporus epinepheli		
Epinephelus striatus (Bloch), Nassau grouper	2	6
Ectenurus americanus		1
Lepidapedon trachinoti	2	
Postporus epinepheli	1	2
Scaphanocephalus sp.		1
Stephanostomum dentatum		2
Eques acuminatus (Bloch & Schneider), cubbyu	3	2
Horatrema crassum		2
Pseudopecoeloides equesi	2	
Eques punctatus Bloch & Schneider, ribbonfish	1	
Horatrema crassum		
Pseudopecoeloides equesi		
Eucinostomus pseudogula (Cuv. & Val.), mojarra		6
Brachadena pyriformis		1
Pseudohurleytrema eucinostomi		1
Gerres cinereus (Walbaum), gray mojarra	13	16
Crassicutis gerridis	2	4
Crassicutis marina		2
Diplangus paxillus		1
†*Homalometron elongatum*		9
Pinguitrema lobata		3
Postmonorchis orthopristis		1
Pseudohurleytrema eucinostomi	2	
Steganoderma hemirhamphi		1
Stephanostomum sentum	2	
Gymnothorax funebris Ranzani, green moray	2	3
Dictysarca virens		2
Dollfustrema muraenae		2
Gymnothorax moringa (Cuvier), spotted moray	10	3
†*Dictysarca virens*		1
Dollfustrema macracanthum	3	
Dollfustrema muraenae	5	1

	C	J
Pseudopecoelus gymnothoracis	1	
Sterrhurus fusiformis	5	1
Stomachicola rubea		1
Gymnothorax vicinus (Castelnau), brown moray	6	2
Dictysarca virens		2
Dollfustrema gymnothoracis	1	
Dollfustrema macracanthum	2	
Dollfustrema muraenae	1	
Sterrhurus fusiformis	1	
Stomachicola rubea		1
Haemulon album (Cuv. & Val.), margate fish	3	2
Genolopa ampullacea		1
Hamacreadium oscitans	2	
Homalometron foliatum	1	
Lasiotocus truncatus	1	
Postmonorchis orthopristis		1
Proctotrema pritchardi	1	
Stephanostomum sentum	1	
Sterrhurus musculus	1	
Haemulon bonariense (Cuv. & Val.), black grunt		12
Brachadena pyriformis		2
Genolopa ampullacea		1
Hamacreadium oscitans		2
Lasiotocus longovatus		4
Lasiotocus truncatus		1
Haemulon flavolineatum (Desmarest), yellow grunt	21	11
Brachadena pyriformis	3	1
Diplangus paxillus		2
Genolopa ampullacea	6	1
Homalometron foliatum	3	1
Lasiotocus longovatus	3	
Lasiotocus truncatus	1	2
†*Leurodera decora*		2
Postmonorchis orthopristis	2	3
Haemulon melanurum (Linnaeus), black-tailedgrunt	2	
Genolopa ampullacea	1	
Hamacreadium oscitons	1	
Haemulon sciurus Shaw, blue-striped grunt		16
Brachadena pyriformis		3
Diplangus parvus		1
Diplangus paxillus		2
Genolopa ampullacea		8
Hamacreadium consuetum		7
Hamacreadium oscitans		4
Helicometrina nimia		1
Homalometron foliatum		4
Lasiotocus longovatus		2
Lasiotocus truncatus		9
Leurodera decora		6
Postmonorchis orthopristis		4
Stephanostomum sentum		1
Sterrhurus musculus		4
Halichoeres pictus (Poey), painted doncella		3
Helicometra execta		2
Schikhobalotrema adacuta		1
Hemirhamphus brasiliense (Linnaeus), balao	17	35
Haplosplanchnoides hemirhamphi		1
†*Lepocreadium hemirhamphi*	11	
Schikhobalotrema adacuta	2	27
Steganoderma hemirhamphi	2	32
Hepsetia stipes (Müller & Troschel), hard-head silverside	16	26
Schikhobalotrema adacuta		10
†*Steganoderma atherinae*		20
Holacanthus tricolor (Bloch), rock beauty	7	5
†*Antorchis holacanthi*		4
Cleptodiscus havanensis		1
Holocentrus ascensionis (Osbeck), squirrel fish	8	19
Helicometra equilata		4
Lecithochirium parvum		2
Lepidapedon truncatum	3	15
Pseudopecoelus barkeri	1	1
†*Pseudopecoelus holocentri*	1	
Stephanostomum pseudocarangis		1
Sterrhurus musculus	1	15
Holocentrus vexillarius (Poey), squirrel fish	1	2
Pseudopecoelus barkeri	1	
Sterrhurus musculus		1
Hypoplectrus unicolor indigo (Poey), butter hamlet		5
Helicometrina nimia		1
Hypoplectrus unicolor (Walbaum), butter hamlet		8
Neolepidapedon hypoplectri		2
Kyphosus sectatrix (Linnaeus), white chub	1	1
Cadenatella kyphosi	1	
Labrisomus bucciferus Poey, blenny		4
Coitocaecum sp.		1
Lachnolaimus maximus (Walbaum), hogfish		5
Helicometrina nimia		1
Myzoxenous lachnolaimi		1
Lactophrys bicaudalis (Linnaeus), trunkfish	1	
Megapera gyrina		
Thysanopharynx elongatus		
Lactophrys tricornis (Linnaeus), common trunkfish	4	8
†*Dermadena lactophrysi*	2	
Megapera gyrina		2
Proctoeces maculatus		1
Pseudocreadium lactophrysi	2	
Xystictum solidum		1
Lactophrys trigonus (Linnaeus), trunkfish	1	4
Dermadena lactophrysi	1	
Neoapocreadium angustum	1	
Pseudocreadium lactophrysi	1	
Lactophrys triqueter (Linnaeus), trunkfish	4	3
Dermadena lactophrysi	4	
Megapera gyrina	1	1
Pseudocreadium lactophrysi	1	1
Leptocephalus conger Linnaeus, conger eel		1
Sterrhurus musculus		
Lutianus analis (Cuv. & Val.), muttonfish	3	1
Metadena crassulata		1
Siphodera vinaledwardsii	1	1
Lutianus apodus (Walbaum), schoolmaster	18	25
Allomegasolena spinosa		1
†*Hamacreadium mutabile*		6
Lecithochirium parvum	1	
Metadena adglobosa	11	18
Metadena globosa		2
Sterrhurus musculus	1	1
Lutianus aya (Bloch), West Indian red snapper	4	
Lecithochirium parvum	1	
Metadena adglobosa	1	
Metadena crassulata	1	
Metadena globosa	1	
Paracryptogonimus neoamericanus	1	
Siphodera vinaledwardsii	1	
Stephanostomum casum	2	
Sterrhurus musculus	3	
Lutianus buccanella (Cuv. & Val.), black-finned snapper	1	
Siphodera vinaledwardsii		
Stephanostomum casum		
Lutianus griseus (Linnaeus), gray snapper	4	2
Hamacreadium mutabile		1
Lecithorchirium parvum		1
Metadena adglobosa	2	1
Sterrhurus musculus	1	
Lutianus jocu (Bloch & Schneider), dog snapper	1	6
Hamacreadium mutabile		1
Helicometrina nimia		1
Metadena adglobosa		5
Lutianus mahogani (Cuv. & Val.), mahogany snapper	2	
Homalometron foliatum	1	
Lasiotocus truncatus	1	
Lutianus synagris (Linnaeus), lane snapper		16
Metadena adglobosa		3
Siphodera vinaledwardsii		14
Stephanostomum casum		3
Lutianus sp.	1	
Stephanostomum sentum		
Malacanthus plumieri (Bloch), sandfish	1	1
Sterrhurus musculus		1
Micropogon furnieri (Desmarest), croaker		6
Diplomonorchis hopkinsi		2
Diplomonorchis micropogoni		3
Lobatostoma ringens		3
Microspathedon chrysurus (Cuv. & Val.), yellow-tailed demoiselle	1	1
Schikhobalotrema pomacentri	1	1
Monacanthus hispidus (Linnaeus), filefish	3	5

	C	J
Apocreadium mexicanum		4
Mugil cephalus Linnaeus, striped mullet	2	
Haplosplanchnus mugilis	1	
Schikhobalotrema elongatum	2	
Mugil curema (Cuv. & Val.), white mullet	10	5
†*Haplosplanchnus mugilis*	9	
Schikhobalotrema elongatum		3
Mycteroperca bonaci (Poey), black grouper	5	1
Deretrema fusillus	1	
Neolepidapedon mycteropercae	1	
Prosorhynchus atlanticum	1	1
Prosorhynchus ozakii	2	
Stephanostomum dentatum	1	
Stephanostomum ditrematis ,	1	
Mycteroperca falcata (Poey), scamp	1	
Prosorhynchus atlanticum		
Mycteroperca venenosa (Linnaeus), yellow-fin grouper	1	
Neolepidapedon mycteropercae		
Prosorhynchus atlanticum		
Myrichthys acuminatus (Gronow), sharp-tailed eel	3	
Carneophallus lactophrysi	3	
Myrichthys oculatus (Kaup), black-spotted snake eel	2	
Carneophallus lactophrysi	2	
Microphallus excellens	1	
Myripristis jacobus (Cuv. & Val.), big-eyed squirrel fish	21	4
Bivesicula caribbensis	19	2
Myrophis punctatus Lutken, speckled worm eel		1
Diplomonorchis myrophitis		
Ocyurus chrysurus (Bloch), yellowtail	11	32
Lepocreadium trullae	7	13
Lepocreadium truncatum	1	
Metadena globosa		1
Paracryptogonimus neoamericanus	4	
Prosogonotrema bilabiatum		1
Siphodera vinaledwardsii	2	7
Oligoplitis saurus (Bloch & Schneider), leather-jacket		4
Manteria brachydera		4
Tergestia pectinata		2
Opisthonema oglinum (Le Sueur), thread-fin herring		8
Bacciger opisthonemae		2
Neogenolinca opisthonemae		6
Parahemiurus merus		7
Tergestia pectinata		1
Peprilus paru (Linnaeus), harvest fish		1
Lepocreadium pyriforme		
Platophrys lunatus (Linnaeus), peacock flounder	1	2
Helicometrina nimia		2
Sterrhurus musculus	1	1
Pomacanthus arcuatus (Linnaeus), black angelfish	4	6
Antorchis urna	2	5
Glyphicephalus candidulus		1
Phyllodistomum pomacanthi		1
Pomacanthus paru (Bloch), French angelfish	5	4
Antorchis urna	4	1
Pomacentrus analis Poey, blue-spotted demoiselle	1	
Schikhobalotrema pomacentri		
Pomacentrus fuscus Cuv. & Val., brown demoiselle	20	14
Schikhobalotrema pomacentri	3	9
Pomacentrus leucostictus Müll. & Trosch., beau-gregory	4	2
Schikhobalotrema pomacentri	1	
Theletrum pomacentri		1
Priacanthus cruentatus (La Cépede), big-eye	3	
Ectenurus virgulus	1	
Prionotus punctatus (Bloch), spotted sea-robin		4
Sterrhurus musculus		1
Promicrops itaiara (Lichtenstein), jewfish		1
Prosorhynchus promicropsi		
Pseudoscarus guacamaia (Cuvier), rainbow parrotfish	9	10
Hapladena ovalis		1
Schikhobalotrema adbrachyura	6	4
Schikhobalotrema heterocotylum	1	
Schikhobalotrema sparisomae	3	8
Pseudoscarus plumbeus Bean, purple parrotfish		2
Schikhobalotrema adbrachyura		1
Rypticus saponaceus (Bloch & Schn.), soapfish	5	2
Prosorhynchus aquayoi	1	2
Sterrhurus musculus	1	
Sardinella anchovia (Cuv. & Val.), Spanish sardine	6	7
†*Neogenolinca opisthonemae*		6
Parahemiurus merus	1	7
Sardinella macrophthalmus (Ranzani), big-eyed sardine	6	14
Ectenurus virgulus		8
Lecithochirium parvum		3
Neogenolinca opisthonemae		2
Opechona sardinellae		2
Parahemiurus merus		12
Pseudobacciger manteri		2
Scarus croicensis (Bloch), Bahama parrotfish	6	1
Schikhobalotrema sparisomae	3	
Scarus sp.		1
Schikhobalotrema sparisomae		
Scomberomorus cavalla (Cuv. & Val.), king mackerel	2	1
Rhipidocotyle baculum	1	
Bucephaloides arcuatus	1	1
Scorpaena plumieri Bloch, West Indian scorpion fish	17	7
Bucephalus scorpaenae	10	3
Hirudinella sp.	1	
Lecithochirium parvum		1
†*Neopecoelus scorpaenae*	10	
Sterrhurus musculus	6	6
Selar crumenophthalmus (Bloch), goggle-eyed scad		10
Chrisomon sp.		1
Ectenurus americanus		6
Ectenurus virgulus		2
Lecithochirium microstomum		10
Lecithochirium parvum		2
Pseudopecoeloides gracilis		8
Sterrhurus musculus		3
Tergestia pectinata		8
Seriola dumerili (Risso), great amberjack	1	4
Bucephalus varicus		2
Ectenurus americanus		1
Lecithochirium microstomum		2
Lecithochirium parvum	1	
Parahemiurus merus		1
Tormopsolus orientalis	1	
Sparisoma abildgaardi (Bloch), red parrotfish	2	2
Schikhobalotrema sparisomae	1	1
Sparisoma brachiale (Poey), parrotfish		2
Hapladena ovalis		1
Schikhobalotrema sparisomae		2
Sparisoma flavescens (Bloch & Schn.), mud parrotfish	25	14
Hapladena ovalis		3
Schikhobalotrema adbrachyura	3	
Schikhobalotrema sparisomae		14
Sparisoma radians (Cuv. & Val.), radiant parrotfish		2
Schikhobalotrema sparisomae		2
Sparisoma viride (Bonnaterre), green parrotfish	1	
Schikhobalotrema adbrachyura		
Spheroides spengleri (Bloch), southern swellfish		4
Diploproctodaeum plicitum		4
Helicometrina nimia		1
Spheroides testudineus (Linnaeus), West Indian puffer	4	13
Diplomonorchis sphaerovarium		5
Diploproctodaeum plicitum		6
Xystretrum solidum		10
Sphyraena barracuda (Shaw), barracuda	6	3
Bucephaloides longicirrus	1	3
Bucephaloides longoviferus	2	1
Strongylura ardeola (Cuv. & Val.), needlefish	1	
Schikhobalotrema acuta		
Steganoderma nitens		
Strongylura raphidoma (Ranzani), houndfish		12
Schikhobalotrema acuta		5
Strongylura timucu (Walbaum), timucu	16	3
Schikhobalotrema acuta	1	
Steganoderma atherinae	1	
Synodus intermedius (Agassiz), lizardfish	3	4
Ectenurus americanus		3
Lecithochirium microstomum		1
Lecithochirium parvum		1
Sterrhurus musculus	2	2
Trachinotus glaucus (Bloch), palometa		1
Ectenurus virgulus		

	C	J
Helicometrina trachinoti		
Sterrhurus musculus		
Upeneus maculatus Bloch, red goatfish	6	4
Opecoeloides brachyteleus	1	2
Opecoeloides elongatus	5	3
Upeneus martinicus Cuv. & Val., yellow goatfish	13	9
Lecithochirium parvum		1
Opecoeloides brachyteleus	4	4
Opecoeloides elongatus	9	5

VIII. List of Negative Fishes

Numbers preceding the letters C and J are of individuals examined in Curaçao and Jamaica, respectively.

Albula vulpes (Linnaeus), bonefish, 3C
Anchoviella epsetus (Bonnaterre), striped anchovy, 1C, 13J
Antennarius ocellatus (Bloch & Schn.), spotted frogfish, 1C
Apogon binotatus (Poey), cardinal fish, 2C
Apogon conklini (Silvester), Conklin's cardinal fish, 1J
Apogon maculatus (Poey), cardinal fish, 9C
Apogon sp., 2C
Apogonichthys stellatus Cope, conchfish, 1C
Bathygobius soporator (Cuv. & Val.), mapo, 19C, 6J
Cephalacanthus volitans (Linnaeus), flying gurnard, 4C
Cephalopholis fulvus (Linnaeus), coney, 5C, 1J
Ceratacanthus scripta (Osbeck), scrawled filefish, 2J
Cetengraulis edentulus (Cuvier), whalebone anchovy, 17J
Chilomycterus atinga (Linnaeus), spotted boxfish, 2J
Chromis marginatus (Castelnau), reef-fish, 19C
Cypselurus bahiensis (Ranzani), flyingfish, 8C
Decapterus punctatus Agassiz round scad, 2C
Diapterus rhombeus (Cuv. & Val.), rhomboild mojarra, 8J
Eleotris perniger (Cope), goby, 7J
Elops saurus Linnaeus, ten-pounder, 5C
Erotelis smaragdus (Cuv. & Val.), emerald goby, 3C
Etropus crossotus Jordan & Gilbert, fringed flounder, 2J
Fistularia tabacaria Linnaeus, cornet fish, 1C
Gramma hemichrysos, royal gramma, 1C
Gymnothorax ocellatus Agassiz, ocellated moray, 3C
Haemulon macrostomum Günther, gray grunt, 1J
Halichoeres bivittata (Bloch), slippery dick, 7C
Halichoeres kirschii (Jord. & Ever.), Kirsche's wrasse, 3C
Hippocampus punctulatus Guichenot, spotted seahorse, 1C, 1J
Hirundichthys affinis (Günther), four-winged flyingfish, 1C
Hypoplectrus unicolor nigricans (Poey), vaca, 1J
Labrisomus nuchipennis (Quoy & Gaim.), hairy blenny, 9C, 6J
Lophogobius cyprinoides (Pallas), crested goby, 6J
Lophogobius glaucofraenum (Gill), bridled goby, 5C
Microgobius sp., goby, 4C
Monacanthus tuckeri Bean, Tucker's filefish, 5C
Mollienesia vandepolli (Van Lindth de Jeude), killifish, 4C
Odontoscion dentex (Cuv. & Val.), corvina, 1J
Ogcocephalus vespertilio (Linnaeus), batfish, 1C
Ophichthus sp., snake eel, 1C
Opisthognathus aurifrons (Jord. & Thomp.), jawfish, 1C
Pempheris muelleri Poey, glassy pempherid, 2C
Priacanthus arenatus Cuv. & Val., common big-eye, 4C
Prionodes tigrinus (Bloch), harlequin serranid, 1C
Rupiscartes atlanticus (Cuv. & Val.), rock-skipper, 3C, 2J
Rypticus bistrispinus (Mitchill), two-spined soapfish, 2J
Scarus caeruleus (Bloch), blue parrotfish, 1J
Stegastes niveatus (Poey), turquoise-spotted demoiselle, 1C
Strongylura notatus (Poey), needlefish, 1J
Syngnathus elucens Poey, Poey's pipefish, 11J
Thalassoma bifasciatum (Bloch), blue-head, 12C

IX. Literature Cited

Baer, J. G. 1943. Les trématodes parasites de la musaraigne d'eau, *Neomys fodiens* (Schreb.). *Bull. Soc. Neuchât. Sc. Nat.* 68: 33-84.

Biguet, J., Deblock, S. and Capron, A. 1958. Contribution à la connaissance des Microphallidae Travassos, 1920 (Trematoda) II. *Ann. Parasitol.* 33: 396-444.

Bravo-Hollis, M. and Manter, H. W. 1957. Trematodes of marine fishes of Mexican waters. X. Thirteen Digenea, including nine new species and two new genera, from the Pacific Coast. *Proc. Helm. Soc. Washington* 24: 35-48.

Cable, R. M. 1954a. Studies on the marine digenetic trematodes of Puerto Rico. The life cycle in the family Haplosplanchnidae. *J. Parasitol.* 40: 71-76.

——————. 1954b. Studies on the marine digenetic trematodes of Puerto Rico. The life cycle in the family Megaperidae. *J. Parasitol.* 40: 202-208.

——————. 1956a. *Opistholebes diodontis* n. sp. Its development in the final host, the affinities of some amphistomatous trematodes from marine fishes and the allocreadioid problem. *Parasitology* 46: 1-13.

——————. 1956b. Marine cercariae of Puerto Rico. *Sci. Sur. of Porto Rico and the Virgin Is.* 16: 491-577.

Cable, R. M. 1962. A cercaria of the trematode family Haploporidae. *J. Parasitol.* 48: 419-422.

——————. 1963. Marine cercariae of Curaçao and Jamaica. *Zeitschr. f. Parasitenk.* 23: 429-469.

—————— and Nahhas, F. M. 1962. *Bivesicula caribbensis* sp. n. (Trematoda: Digenea) and its life history. *J. Parasitol.* 48: 536-538.

—————— and ——————. 1963. The cercaria of *Dichadena acuta* Linton, 1910 (Trematoda: Hemiuridae). *Proc. Helm. Soc. Washington* 30: 206-210.

Dollfus, R. Ph. 1946. Sur trois espèces de distomes, dont une a 17 ventouses (*Enenterum (Jeancadenatia) brumpti* n. sp.) parasites du poisson marin *Kyphosus sectatrix* (L.) *Ann. Parasitol.* 21: 119-128.

Hanson, M. L. 1950. Some digenetic trematodes of marine fishes of Bermuda. *Proc. Helm. Soc. Washington* 17: 74-89.

——————. 1955. Some digenetic trematodes of plectognath fishes of Hawaii. *Proc. Helm. Soc. Washington* 22: 75-87.

Holliman, R. B. 1961. Larval trematodes from the Apalachee Bay area, Florida, with a checklist of known marine cercariae arranged in a key to their superfamilies. *Tulane Stud. Zool.* 9: 1-74.

Hopkins, S. H. 1941. New genera and species of the family Monorchiidae (Trematoda), with a discussion of the excretory system. *J. Parasitol.* 27: 395-407.

HUNNINEN, A. V. and CABLE, R. M. 1941. Studies on the life history of *Anisoporus manteri* Hunninen and Cable, 1940 (Trematoda: Allocreadiidae). *Biol. Bull.* 80: 415-428.

LA RUE, G. R. 1957. The classification of digenetic Trematoda: A review and a new system. *Exp. Parasitol.* 6: 306-349.

LE ZOTTE, JR., L. A. 1954. Studies on marine digenetic trematodes of Puerto Rico: The family Bivesiculidae, its biology and affinities. *J. Parasitol.* 40: 148-162.

LINTON, E. 1898. Notes on trematode parasites of fishes. *Proc. U. S. Nat. Mus.* 20: 507-548.

——————. 1900. Fish parasites collected at Woods Hole in 1898. *Bull U. S. Fish. Comm.* (1899) 19: 267-304.

——————. 1901. Parasites of fishes of the Woods Hole region. *Bull. U. S. Fish Comm.* (1899) 19: 405-492.

——————. 1905. Parasites of fishes of Beaufort, North Carolina. *Bull. U. S. Bur. Fish.* (1904) 24: 321-428.

——————. 1907. Notes on parasites of Bermuda fishes. *Proc. U. S. Nat. Mus.* 33:85-126.

——————. 1910. Helminth fauna of the Dry Tortugas. II. Trematodes. *Carnegie Inst. Wash. Pub.* No. 133: 11-98.

——————. 1940. Trematodes from fishes mainly from the Woods Hole region Massachusetts. *Proc. U. S. Nat. Mus.* 88: 1-172.

MACCALLUM, G. A. 1917. Some new forms of parasitic worms. *Zoopathologica* 1: 43-75.

——————. 1918. Notes on the genus *Telorchis* and other trematodes. *Zoopathologica* 1: 77-98.

MANTER, H. W. 1931. Some digenetic trematodes of marine fishes of Beaufort, North Carolina. *Parasitology* 23: 396-411.

——————. 1940a. Digenetic trematodes of fishes from the Galapagos Islands and the neighboring Pacific. *Rep. Allan Hancock Pac. Exp.* 2: 329-497.

——————. 1940b. The geographical distribution of digenetic trematodes of marine fishes of the tropical American Pacific. *Rep. Allan Hancock Pac. Exp.* 2: 531-547.

——————. 1940c. Gasterostomes (Trematoda) of Tortugas, Florida. *Carnegie Inst. Washington Pub.* No. 524: 1-19.

——————. 1942. Monorchidae (Trematoda) from fishes of Tortugas, Florida. *Trans. Am. Microscop. Soc.* 61: 349-360.

——————. 1945. *Dermadena lactophrysi* n. gen., n. sp. (Trematoda: Lepocreadiidae) and consideration of the related genus *Pseudocreadium*. *J. Parasitol.* 31:411-417.

——————. 1947. The digenetic trematodes of marine fishes of Tortugas, Florida. *Amer. Midl. Nat.* 38: 257-416.

——————. 1949. An additional trematode from Tortugas, Fla. and a new name for *Opisthoporus Manter*, 1947, preoccupied. *Amer. Midl. Nat.* 41:432-435.

——————. 1954. Some digenetic trematodes from fishes of New Zealand. *Trans. Roy. Soc. New Zealand* 82: 475-568.

——————. 1955. The zoogeography of trematodes of marine fishes. *Exp. Parasitol.* 4: 62-86.

——————. 1957. Host specificity and other host relationships among the digenetic trematodes of marine fishes. First symposium on host specificity among parasites of vertebrates. *Neuchatel.* 185-198.

——————. 1963a. Studies on digenetic trematodes of fishes of Fiji. II. Families Lepocreadiidae, Opistholebetidae, and Opecoelidae. *J. Parasitol.* 49: 99-113.

——————. 1963b. Studies on digenetic trematodes of fishes of Fiji. IV. Families Haploporidae, Angiodictyidae, Monorchiidae, and Bucephalidae. *Proc. Helm. Soc. Washington* 30: 224-232.

——————. and PRITCHARD, MARY HANSON. 1961. Studies on digenetic trematodes of Hawaiian fishes: families Monorchiidae and Haploporidae. *J. Parasitol.* 47:483-492.

MEHRA, H. R. 1961. New Superfamily Haploporoidea (Suborder Echinostomata, Szidat, 1939; Order Echinostomida La Rue, 1957 Syn. Fasciolatoidea Szidat, 1936). *Proc. Nat. Acad. Sci.* (India) Sec. B, 31: 383-384.

NAGATY, H. F. 1948. Trematodes of fishes from the Red Sea. Part 4. On some new and known forms with a single testis. *J. Parasitol.* 34: 355-363.

NICHOLL, W. 1914. The trematode parasites of fishes from the English Channel. *J. Mar. Biol. Ass. U. K.* n.s. 10: 466-505.

PALOMBI, A. 1934. *Bacciger bacciger* (Rud.). trematode digenetico: fam. Steringophoridae Odhner. Anatomia, sistematica e biologia. *Publ. Staz. Zool. Napoli* 13: 438-478.

PÉREZ VIGUERAS, I. 1940a. *Macrorchitrema havanensis* n. gen., n. sp. (Trematoda: Paramphistomidae) parasito del intestino de *Holacanthus tricolor* Bloch (Pisces). *An. Inst. Biol.* (Mexico) 11: 197-207.

——————. 1940b. Prosogonotremidae n. fam. *Prosogonotrema bilabiatum* n. gen., n. sp. (Trematoda, Distomata) parasito de *Ocyurus chrysurus* (Bloch) (Pisces). *Mem. Soc. cubana Hist. nat.* 14: 249-252.

——————. 1955a. Contribucion al conocimiento de la fauna helminthologica cubana. *Mem Soc. cubana Hist. nat.* 22: 21-71.

——————. 1955b. Descripcion de *Bianium lecanocephalum* n. sp. (Trematoda, Lepocreadiidae), parasito de *Osbeckia scripta* (Pisces). *Mem. Soc. cubana Hist. nat.* 22: 191-194.

——— . 1955c. Descripcion de seis especies nuevas de trematodes de la familia Acanthocolpidae y division del genero *Stephanostomum* en subgeneros. *Rev. Ibérica de Parasitol.* Tomo Extraordinario: 421-441.

——— . 1956. Contribucion al conocimiento de la fauna helmintologica cubana. *Mem. Soc. cubana Hist. nat.* "Felipe Poey" 23: 1-36.

——— . 1958. Contribucion al conocimiento de la fauna helmintologica cubana. *Mem. Soc. cubana Hist. nat.* 24: 17-38.

PETERS, L. E. 1961. The allocreadioid problem with reference to the excretory system in four types of cercariae. *Proc. Helm. Soc. Washington* 28: 102-108.

PRICE, E. W. 1934. New digenetic trematodes from marine fishes. *Smithsonian Misc. Coll.* 91: 1-8.

SIDDIQI, A. H. and CABLE, R. M. 1960. Digenetic trematodes of marine fishes of Puerto Rico. *Sci. Sur. Porto Rico and the Virgin Is.* 17: 257-369.

SKRJABIN, K. I. 1947-1961. Trematodes of animals and man (in Russian). Vols. 1-19, *U.S.S.R. Academy of Science* (Moscow).

SOGANDARES-BERNAL, F. 1959. Digenetic trematodes of marine fishes from the Gulf of Panama and Bimini, British West Indies. *Tulane Stud. Zool.* 7: 69-117.

——— and HUTTON, R. F. 1959a. Studies on helminth parasites of the coast of Florida. I. Digenetic trematodes of marine fishes from Tampa and Boca Ciega Bays with description of two new species. 1. *Bull. Mar. Sci. Gulf Carib.* 9: 53-68.

——— and ——— 1959b. Studies on helminth parasites from the coast of Florida. III. Digenetic trematodes of marine fishes from Tampa and Boca Ciega Bays. *J. Parasitol.* 45: 337-346.

——— and ——— 1959c. Studies on helminth parasites from the coast of Florida. IV. Digenetic trematodes of marine fishes of Tampa, Boca Ciega Bays, and the Gulf of Mexico. 3. *Quart. J. Florida Acad. Sci.* 21: 259-273.

——— and ——— 1960. The status of some marine species of *Lepocreadium* Stossich, 1904 (Trematoda: Lepocreadiidae) from the North American Atlantic. *Lib. Hom. E. Caballero y C.* (Mexico): 275-283.

——— and SOGANDARES, L. MCA. 1961. Nine digenetic trematodes of marine fishes from the Atlantic coast of Panama. *Tulane Stud. Zool.* 8: 141-153.

SPARKS, A. K. 1957. Some digenetic trematodes of marine fishes of the Bahama Islands. *Bull. Mar. Sci. Gulf Carib.* 7: 255-265.

——— . 1958. Some digenetic trematodes of fishes of Grand Isle, Louisiana. *Proc. Louisiana Acad. Sci.* 20: 71-82.

——— . 1960. Some aspects of the zoogeography of the digenetic trematodes of shallow-water fishes of the Gulf of Mexico. *Lib. Hom. E. Caballero y C.* (Mexico): 285-298.

THOMAS, J. D. 1959. Trematodes of Ghanaian sub-littoral fishes. 1. The family Monorchiidae. *J. Parasitol.* 45: 95-113.

VON WICKLEN, J. H. 1946. The trematode genus *Opecoeloides* and related genera, with a description of *Opecoeloides polynemi* n. sp. *J. Parasitol.* 32:156-163.

WINTER, H. A. 1957. Trematodos de peces marinos de aguas mexicanas. XII. Dos generos de digeneos (Lepocreadiidae) incluyendo una nueva especie procedente de *Kyphosus elegans* (Peters) de las Islas Tres Marias, en el Oceano Pacifico. *An. Inst. Biol. Univ. Nac. Mexico* 27: 403-413.

YAMAGUTI, S. 1934. Studies on the helminth fauna of Japan. Part 2. Trematodes of fishes, I. *Jap. J. Zool.* 5:249-541.

——— . 1958. Systema Helminthum. Vol. 1. Digenetic trematodes of vertebrates, in 2 parts, New York. 1575 pp.

X. ABSTRACT

Examination of 1527 fishes representing 185 species yielded 178 species of trematodes including 39 new species, for 5 of which new genera are erected. New species in previously known genera, their hosts, localities (C = Curaçao, J = Jamaica), and families are: *Dollfustrema gymnothoracis* from *Gymnothorax vicinus*, C, (Bucephalidae); *Infundibulostomum anisotremi* from *Anisotremus virginicus*, J; and *Bacciger opisthonemae* from *Opisthonema oglinum*, J, (Fellodistomatidae); *Haplosplanchnus mugilis* from *Mugil curema*, C; *Schikhobalotrema bivesiculum* from *Abudefduf saxatilis*, J; *S. elongatum* from *Mugil cephalus* and *M. curema*, C, J; and *S. heterocotylum* from *Pseudoscarus guacamaia*, C, (Haplosplanchnidae); *Megapera pseudogyrina* from *Cantherines pullus*, J, (Megaperidae); *Crassicutis gerridis* from *Gerres cinereus*, C, J; *Neolepidapedon hypoplectri* from *Hypoplectrus unicolor*, J; *Opechona chloroscombri* from *Chloroscombrus chrysurus*, J; *O. sardinellae* from *Sardinella macrophthalmus*, J; *Lepocreadium truncatum* from *Ocyurus chrysurus*, C; *L. hemiramphi* from *Hemiramphus brasiliensis*, C; *Cadenatella kyphosi* from *Kyphosus sectatrix*, C; *Diploproctodaeum diodontis* from *Diodon hystrix*, J; and *Pseudocreadium lactophrysi* from *Lactrophrys tricornis*, C, J, (Lepocreadiidae); *Pseudopecoelus holocentri from Holocentrus ascensionis*, C; *P. gymnothoracis* from *Gymnothorax moringa*, C; and *P. minutus* from *Doratonotus megalepis*, C, (Opecoelidae); *Phyllodistomum pomacanthi* from *Po-*

macanthus arcuatus, J, (Gorgoderidae); *Diphtherostomum anisotremi* from *Anisotremus virginicus*, J, (Zoogonidae); *Proctotrema pritchardae* from *Haemulon album*, C; *P. anisotremi* from *Anisotremus virginicus*, J; *Chrisomon decapteri* from *Decapterus macarellus*, C; *Hurleytrematoides curacaensis* from *Chaetodon capistratus*, C; *Diplomonorchis myrophitis* from *Myrophis punctatus*, J; *D. micropogoni* from *Micropogon furnieri* and *Archosargus unimaculatus*, J; *D. hopkinsi* from *Micropogon furnieri*, J; and *D. sphaerovarium* from *Spheroides testudineus*, J, (Monorchiidae); *Stephanostomum aulostomi* from *Aulostomus maculatus*, C, (Acanthocolpidae); *Genolinea noblei* from *Abudefduf saxatilis*, C; *Hysterolecitha sogandaresi* from *Acanthurus coeruleus*, J; and *Theletrum pomacentri* from *Pomacentrus leucosticus*, J, (Hemiuridae).

New genera and species, their hosts, localities and families are: *Gymnotergestia chaetodipteri* from *Chaetodipterus faber*, J; *Pseudobacciger manteri* from *Sardinella macrophthalmus*, J (Fellodistomatidae); *Haplosplanchnoides hemiramphi* from *Hemiramphus brasiliensis*, J (Haplosplanchnidae); *Diplohurleytrema brevicaecum* from *Echidna catenata*, C (Monorchiidae); *Monorchimacradena acanthuri* from *Acanthurus hepatus*, C, J (Hemiuridae).

New names for previously misidentified species are: *Pseudobacciger manteri*, *Pseudopecoelus holocentri* (listed above), and *Alicornis siddiqii* (Puerto Rico). New combinations are: *Cleptodiscus havanensis* for *Macrorchitrema h.*, *Cadenatella brumpti* for *Jeancadenatia b.*, and *Cadenatella dohenyi* for *Jeancadenatia d.*

The following species are reduced to synonomy as indicated: *Proctoeces neomagnoris* = *Mesolecitha linearis*; *Lepidapedon holocentri* = *L. truncatum*; *Pseudoplagioporus brevivitellus* = *Hamacreadium oscitans*; *Steganoderma elongatum* = *S. nitens*; *Genolopa longicaudata* = *G. ampullacea*; and *Aponurus symmetrorchis* = *Brachadena pyriformis*.

Possible affinity of the *Eneterum* group with the *Haploporoidea* is discussed. The Suborder Acanthocolpiata and Superfamily Acanthocolpoidea are proposed for the Family Acanthocolpidae, and placed in the Order Opisthorchiida, Superorder Epitheliocystidia of La Rue's system.

Data concerning geographical distribution and host-parasite specificity are presented in tables and discussed.

XI. INDEX OF TREMATODE SPECIES

(New species and genera in boldface)

Alcicornis carangis, 171
  siddiqii, 172
Allomegasolena spinosa, 179
Antorchis holacanthi, 174
  urna, 174
Apocreadium balistis, 190
  mexicanum, 190
Aponurus elongatus, 213

Bacciger **opisthonemae**, 177
Bivesicula caribbensis, 178
Brachadena pyriformis, 212
Bucephaloides arcuatus, 173
  longicirrus, 173
  longoviferus, 173
Bucephalus scorpaenae, 171
  varicus, 170
  sp., 171

Cadenatella **kyphosi**, 190
Carneophallus lactophrysi, 184
Chrisomon **decapteri**, 202
Cleptodiscus havanensis, 178
Coitocaecum sp., 198
Cotylogaster basiri, 170
Crassicutis **gerridis**, 184
  marina, 184

Deretrema fusillum, 199
Dermadena lactophrysi, 194
Dichadena acuta, 213
Dictysarca virens, 216

Dinurus barbatus, 212
  breviductus, 212
  tornatus, 212
Diplangus parvus, 199
  paxillus, 199
Diphtherostomum **anisotremi**, 200
Diplohurleytrema brevicaecum, 205
Diplomonorchis hopkinsi, 206
  micropogoni, 206
  myrophitis, 206
  sphaerovarium, 206
Diploproctodaeum **diodontis**, 193
  haustrum, 192
  plicitum, 192
Dollfustrema **gymnothoracis**, 172
  macracanthum, 172
  muraenae, 172

Ectenurus americanus, 212
  virgulus, 212

Genolinea **noblei**, 212
Genolopa ampullacea, 200
  brevicaecum, 201
Glyphicephalus candidulus, 179
Gymnotergestia chaetodipteri, 176

Hamacreadium consuetum, 194
  mutabile, 194
  oscitans, 194
Hapladena ovalis, 179
  varia, 179

Haplosplanchnoides hemiramphi, 183
Haplosplanchnus **mugilis**, 179
Helicometra equilata, 195
  execta, 195
Helicometrina nimia, 195
  trachinoti, 195
Hirudinella sp., 216
Homalometron elongatum, 184
  foliatum, 184
Horatrema crassum, 195
Hurleytrematoides chaetodoni, 204
  curacaensis, 205
Hysterolecitha rosea, 213
  sogandaresi, 213

Infundibulostomum **anisotremi**, 176

Lasiotocus longicaecum, 201
  longovatus, 201
  truncatus, 201
Lecithochirium microstomum, 212
  parvum, 212
Lepidapedon trachinoti, 186
  truncatum, 186
Lepocreadium bimarinum, 188
  hemiramphi, 189
  opsanusi, 189
  pyriforme, 188
  trulla, 188
  truncatum, 189
Leurodera decora, 213
Lobatostoma ringens, 170

Macradena perfecta, 213
Manteria brachydera, 211
Megapera gyrina, 183
  pseudogyrina, 183
Megasolena archosargi, 179
Mesolecitha linearis, 174
Metadena adglobosa, 209
  crassulata, 209
  globosa, 209
Microphallus excellens, 184
Monorchimacradena acanthuri, 214
Multitestis blennii, 187
  chaetodoni, 187
  inconstans, 187
  rotundus, 187
Myzoxenous lachnolaimi, 190

Neoapocreadium angustum, 190
  coili, 190
Neogenolinea opisthonemae, 212
Neolepidapedon **hypoplectri**, 186
  mycteropercae, 186
Neopecoelus scorpaenae, 195

Opechona **chloroscombri**, 187
  sardinellae, 188
Opecoeloides brachyteleus, 195
  elongatus, 195
  vitellosus, 195
Opistholebes diodontis, 198

Pachycreadium crassigulum, 198
Paracryptogonimus neoamericanus, 209
Parahemiurus merus, 211
Phyllodistomum **pomacanthi**, 198
Pinguitrema lobatum, 195
Postmonorchis orthopristis, 204
Postporus epinepheli, 190
Proctoeces lintoni, 174
  maculatus, 174
Proctotrema **anisotremi**, 202
  pritchardae, 201
Prosogonotrema bilabiatum, 216
Prosorhynchus aguaoi, 174
  atlanticum, 174
  ozakii, 174
  promicropsi, 174
Pseudobacciger manteri, 177
Pseudocreadium anandrum, 194
  galapagoensis, 194
  lactophrysi, 193
  lamelliformae, 194
Pseudopecoeloides equesi, 195
  carangi, 195
  gracilis, 195
Pseudopecoelus barkeri, 196
  gymnothoracis, 196
  holocentri, 196
  minutus, 196
Pseudohurleytrema eucinostomi, 204

Rhagorchis odhneri, 190
Rhipidocotyle baculum, 173

Scaphanocephalus sp., 209
Schikhobalotrema acutum, 180
  adacutum, 180
  adbrachyurum, 180
  bivesiculum, 180
  elongatum, 182
  heterocotylum, 182
  obtusum, 180
  pomacentri, 180
  sparisomae, 180
Sclerodistomum sphoeroidis, 216
Siphodera vinaledwardsii, 209
Steganoderma atherinae, 200
  hemiramphi, 199
  nitens, 199
Stephanostomum **aulostomi**, 210
  casum, 210
  coryphaenae, 210
  dentatum, 210
  ditrematis, 210
  megacephalum, 210
  pseudocarangis, 210
  sentum, 210
Sterrhurus fusiformis, 211
  musculus, 211
Stomachicola rubea, 212

Tergestia acuta, 174
  laticollis, 174
  pectinata, 174
Tetrochetus coryphaenae, 216
Theletrum **pomacentri**, 214
Thysanopharynx elongatus, 183
Tormopsolus orientalis, 211

Xystretrum solidum, 198